DOCUMENT RESUME

ED 178 291 SE 028 484

AUTHOR	Hathway, James A., Ed.
TITLE	Individualized Testing System: Performance Checks, ISCS Level III, WW-CP Form C.
INSTITUTION	Florida State Univ., Tallahassee. Curriculum Study Center.
SPONS AGENCY	National Science Foundation, Washington, D.C.
PUB DATE	73
NOTE	74p.; For related documents, see SE 028 460-488
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Academic Achievement; Course Evaluation; Elementary Secondary Education; *Evaluation; *Individualized Programs; Junior High Schools; *Performance Tests; *Science Course Improvement Project; Science Education; Science Materials; Science Tests; *Student Evaluation
IDENTIFIERS	*Intermediate Science Curriculum Study; *National Science Foundation

ABSTRACT

This is one form of three performance checks booklets (A, B, and C) for two texts of Level III of the Intermediate Science Curriculum Study (ISCS). These two texts are Winds and Weather (WW), and Crusty Problems (CP). The 12 performance checks booklets for Level III are considered one of four subdivisions of a set of individualized evaluation materials for Level III of the ISCS. This booklet (form C), developed to assess the students' achievement of the objectives of WW and CP of Level III, contains a set of performance checks which are equivalent to the performance checks of the other two forms (A and B). Each performance check has its own code number which indicates the unit number and identifies whether it is based on core materials or excursions. Directions for students' use of performance checks are also included. (HM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

INTERMEDIATE SCIENCE CURRICULUM STUDY

ED178291

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Mary L. Charles
NSF
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

INDIVIDUALIZED TESTING SYSTEM

Performance Checks

ISCS LEVEL III
WW-CP
FORM C

SE 028 484

SILVER BURDETT
GENERAL LEARNING CORPORATION
Morristown, New Jersey · Park Ridge, Ill. · Palo Alto · Dallas · Atlanta

INDIVIDUALIZED TESTING SYSTEM

ALL LEVELS	**Individualizing Objective Testing** (an ITP module) **Evaluating and Reporting Progress** (an ITP module)
LEVEL I	**Performance Objectives**, ISCS Level I **Performance Checks**, ISCS Level I, Forms A, B, and C **Performance Assessment Resources**, ISCS Level I, Parts 1 and 2
LEVEL II	**Performance Objectives**, ISCS Level II **Performance Checks**, ISCS Level II, Forms A, B, and C **Performance Assessment Resources**, ISCS Level II, Parts 1 and 2
LEVEL III	**Performance Objectives**, ISCS Level III **Performance Checks**, ISCS Level III, ES-WB, Forms A, B, and C WYY-IV, Forms A, B, and C IO-WU, Forms A, B, and C WW-CP, Forms A, B, and C **Performance Assessment Resources**, ISCS Level III, ES-WB WYY-IV IO-WU WW-CP

ACKNOWLEDGMENTS

The work presented or reported herein was supported by funds provided by the National Science Foundation. However, the opinions expressed herein do not necessarily reflect the position or policy of the National Science Foundation, and no official endorsement by the agency should be inferred.

© 1974 THE FLORIDA STATE UNIVERSITY

All rights reserved. Printed in the United States of America. Published simultaneously in Canada. Copyright is claimed until 1979. Except for the rights to materials reserved by others, the Publishers and the copyright owner hereby grant permission to domestic persons of the United States and Canada for use of this work without charge in the English language in the United States and Canada after 1979 provided that the publications incorporating materials covered by the copyrights contain an acknowledgment of them and a statement that the publication is not endorsed by the copyright owner. For conditions of use and permission to use materials contained herein for foreign publications in other than the English language, apply to the copyright owner. This publication, or parts thereof, may not be reproduced in any form by photographic, electrostatic, mechanical, or any other method, for any use, including information storage and retrieval, without written permission from the publisher.

ILLUSTRATIONS: © 1974 GENERAL LEARNING CORPORATION
ALL RIGHTS RESERVED.

ISCS STAFF

David D. Redfield, Co-Director
William R. Snyder, Co-Director
Ernest Burkman, Steering Committee Chairman

Marcia Bujold, Artist
Stewart P. Darrow, Teacher Education
George O. Dawson, Teacher Education
Cheval Fagan, Artist
Ronald N. Giese, Evaluation
James A. Hathway, Editor
Adrian D. Lovell, Administration and Field Trial Coordinator
Janet Mauney, Artist
Millicent Shargel, Grammarian
Stephen C. Smith, Art Director
Lois S. Wilson, Assistant Editor

MATERIALS DEVELOPMENT CONTRIBUTORS

Betsy Conlon Balzano, State University of New York at Brockport
Gary Carroll, F.S.U.
Susan K. Castle, Norristown, Pa.
Robert L. Cocanougher, F.S.U.
Allan D. Dawson, F.S.U.
Linda Dubaldi, F.S.U.
Gregory Eckles, Hatboro, Pa.
William H. Fletcher, F.S.U.
Bonnie C. Frear, Ardmore, Pa.
John Hassard, Georgia State University
John Hockett, Governors State University
Linda MacGregor, Warminster, Pa.
Luis A. Martinez-Perez, Florida International University
Gerald G. Neufeld, F.S.U.
Lawrence E. Oliver, F.S.U.
Barney Parker, F.S.U.
Lynn H. Rogers, F.S.U.
George W. Rumpp, Hatboro, Pa.
John Selgrath, Warminster, Pa.
Everett S. Stallings, F.S.U.

FOREWORD

To implement an educational approach successfully, one must match the philosophy of evaluation with that of instruction. This is particularly true when individualization is the key element in the educational approach. Yet, as important as it is to achieve this match, the task is by no means simple for the teacher. In fact, without specific resource materials to help him, he is apt to find the task overwhelming. For this reason, ISCS has developed a set of individualized evaluation materials as part of its Individualized Teacher Preparation (ITP) program. These materials are designed to assist teachers in their transition to individualized instruction and to help them tailor their assessment of students' progress to the needs of all their students.

The two modules concerned with evaluation, *Individualizing Objective Testing* and *Evaluating and Reporting Progress*, can be used by small groups of teachers in in-service settings or by individual teachers in a local school environment. Hopefully, they will do more than give each teacher an overview of individualized evaluation. These ITP modules suggest key strategies for achieving both subjective and objective evaluation of each student's progress. And to make it easier for teachers to put such strategies into practice, ISCS has produced the associated booklets entitled *Performance Objectives, Performance Assessment Resources*, and *Performance Checks*. Using these materials, the teacher can objectively assess the student's mastery of the processes, skills, and subject matter of the ISCS program. And the teacher can obtain, at the moment when they are needed, specific suggestions for remedying the student's identified deficiencies.

If you are an ISCS teacher, selective use of these materials will guide you in developing an individualized evaluation program best suited to your own settings and thus further enhance the individualized character of your ISCS program.

The Co-Directors
Intermediate Science Curriculum Study
Rm 415, W.H. Johnston Building
415 North Monroe Street
Tallahassee, Florida 32301

NOTES TO THE STUDENT

Now that you have completed several chapters, excursions or resources, and self-evaluations, you are ready to help your teacher determine how well you are doing. The performance checks in this book will provide your teacher with this information. Then your teacher can help you with things you may not understand and can keep a record of your progress.

Read the next section carefully. It explains some important things about the performance checks in this book, and it gives you specific suggestions for using them.

What You Need To Know about Performance Checks

1. **You do performance checks when you are ready.** Performance checks are somewhat like the questions in the self-evaluations — you do them when you are ready, not when the whole class is ready.
2. **Your teacher or both of you decide how many you do.** Your teacher or you and your teacher together will decide which ones you should do. You are not expected to do all of the performance checks.
3. **There are three forms for each performance check.** Every performance check is written in three forms — A, B, and C. (The title of this booklet tells you whether it is Form A, B, or C.) Usually the answers for each form are different. When you do a check, you will use only one form. The A, B, and C forms are always in different booklets. Within each booklet all the performance objectives for the same unit are listed together. A unit contains two or three chapters and their related excursions or resources. These units are in numerical order. Each unit has performance checks based on core material and performance checks based on excursions or resources.
4. **Each performance check has its own number.** The number is in the outside margin of the page and will look like this: WW-03-Core-17A, WW-01-Exc 2-1-2A, CP-03-Core-17A, or CP-01-Res 3-2A. These numbers mean

WW - 03 - Core - 17 A and WW - 01 - Exc 2-1 - 2 A

- WW — text
- 03 — unit
- Core — based on core material
- 17 — check number
- A — form of the check
- Exc — excursion material
- 2-1 — resource number — excursion number
- 2 — check number
- A — form of the check

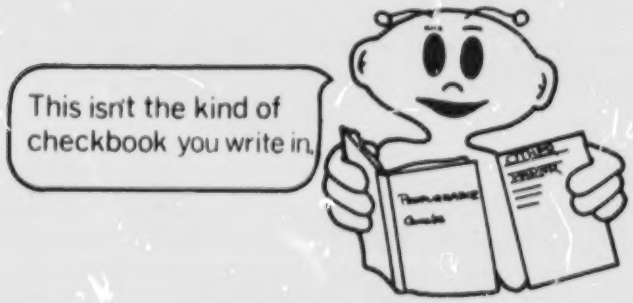
CP - 03 - Core - 17 A and CP - 01 - Res 3 - 2 A

5. **Each performance check is separated from the other.** There is a line before each performance check and one after it. Some performance checks have several parts, so do everything called for between the lines. If there is no line at the bottom of a page, the check is continued onto the next page.

6. **Sometimes you will need to use equipment.** If special materials are needed, they will be in boxes labeled with the same number and sometimes the same letter too as the performance check for which you need them.

7. **Some performance checks have two or more answers.** If more than one answer is correct, you must select all the correct choices. In such cases, selecting just one answer is not enough.

8. **Some performance checks have no answers.** Occasionally, you may be asked to do something that is impossible and to explain your answer. If so, say that the task is impossible and explain why.



9. **You share books of performance checks and YOU DO NOT WRITE IN THEM.** Write your answers on other paper. Give the number and form of the performance check for each answer you write. If you are to draw a graph, a chart, or a map, your teacher may provide you with grid paper or a copy of the chart or map.

10. **Your teacher or his assistant will collect and mark your checks.** And sometimes you must ask him to watch or assist you as you do a check.

11. **Sometimes a review procedure will be suggested.** If you can't do a performance check, you may be asked to review a part of the text or a self-evaluation question. You may then be checked on the same material, so be sure you understand the material you review. Get help if you need it.

Winds and Weather

WW

Judy placed a dish of cold water in a sealed observation box, as shown below. The dots represent air particles.

WW
01-Core-1C

Diagram a.

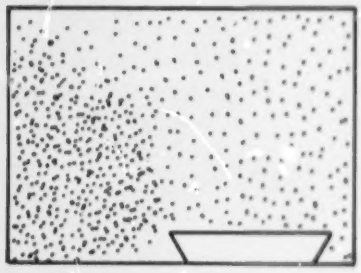


Diagram b.

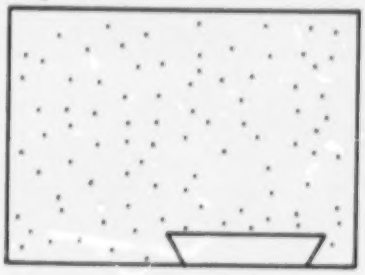
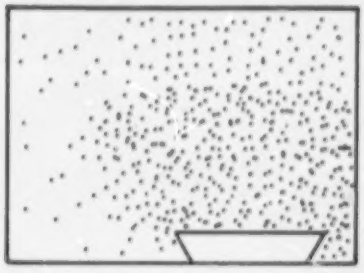


Diagram c.



1. Which of the diagrams above best shows how the air particles will be scattered in her observation box?
2. Explain the reasons for your choice.

Below there are three bags. Each is open at the bottom and each contains air. The small dots represent air particles.

WW
01-Core-2C

Diagram a.

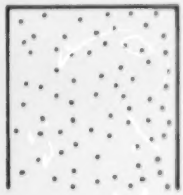
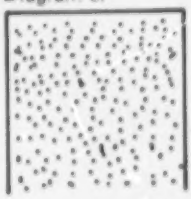


Diagram b.

Diagram c.



1. Which bag contains the warmest air?
2. Explain your answer on the basis of what the particle model says about heat and matter particles.

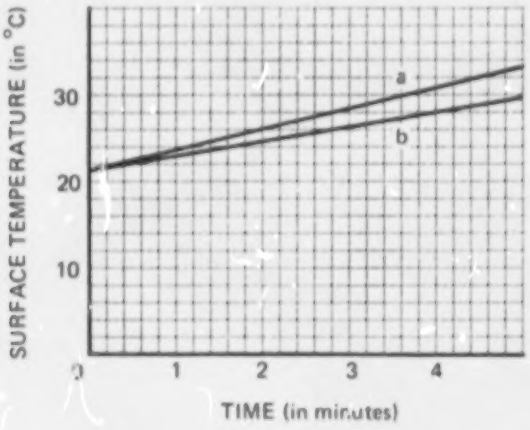
About ten minutes before Ted takes some friends for a ride in his motorboat, he dampened the seats. A practical reason for his action would be that

WW
01-Core-3C

a. he wants to make the seats slippery so his friends will sit in the bottom of the boat where it's safer.
b. wet seats will cause fish to be attracted to the motorboat.
c. he knows that water will make the seats hotter, which might make his friends decide not to go with him.
d. he believes that water spread on the seats will cool them and make them more comfortable for him and his friends.

WW
01-Core-4C

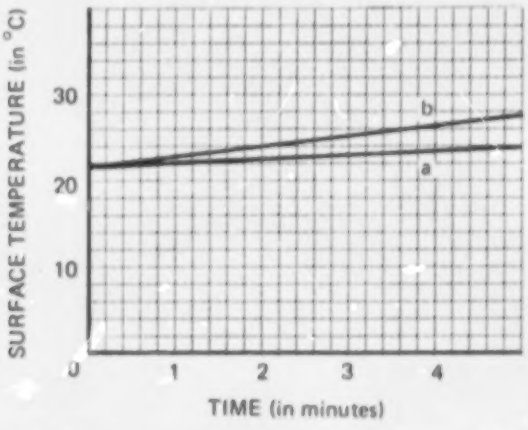
Dan measured the surface temperature of two different lumps of dry clay that he placed in sunlight. One lump of clay was white; the other was dark gray. He plotted their surface temperatures on the grid shown below.



1. Which graph (line), a or b, represents the surface temperature of the white clay?
2. Explain your choice.

WW
01-Core-5C

Sheila had a container of wet gravel and a container of dry gravel. She placed both in sunlight. She measured the surface temperatures in the two containers and plotted these temperatures as shown below.



1. Which of the two graphs (lines), a or b, represents the surface temperature of the wet gravel?
2. Explain your answer.

Arrange the following events in the order in which they occur. **WW 01-Core-6C**

1. The air above an island warming faster than the air above the ocean
2. The island and the ocean warming at different rates
3. The sun heating the ocean and the island
4. An up-and-down motion of air above the island and the ocean

---

On a sunny, windless day at camp, Wayne was given the assignment of measuring the air temperature above four different unshaded surfaces. He checked the following surfaces. **WW 01-Core-7C**

a. The light-colored concrete area around the swimming pool
b. The black asphalt shuffleboard court
c. The grass-covered badminton court
d. The moist, black dirt in the vegetable garden

Above which surface would he record the highest air temperature?

One day as Tony was sitting in a field, he noticed that a glider was circling overhead. The glider, of course, had no motor and was not towed during the ten minutes he watched it, yet it kept rising higher in the sky. How was it possible for the glider to stay up and even to rise without having any source of power? **WW 01-Core-8C**

Buddy and Eric were discussing the heating of air and surfaces. Buddy argued that the sun first heats a dark-colored surface and that this warm surface then heats the air above it. Eric said that the sun heated the air first and then this hot air heated the surface below it. State a plan to find out who is correct. **WW 01-Core-9C**

Go to the weather instrument that your teacher has set up in the classroom. Make the readings from the weather instrument, and record them on your answer paper. **WW 01-Core-10C**

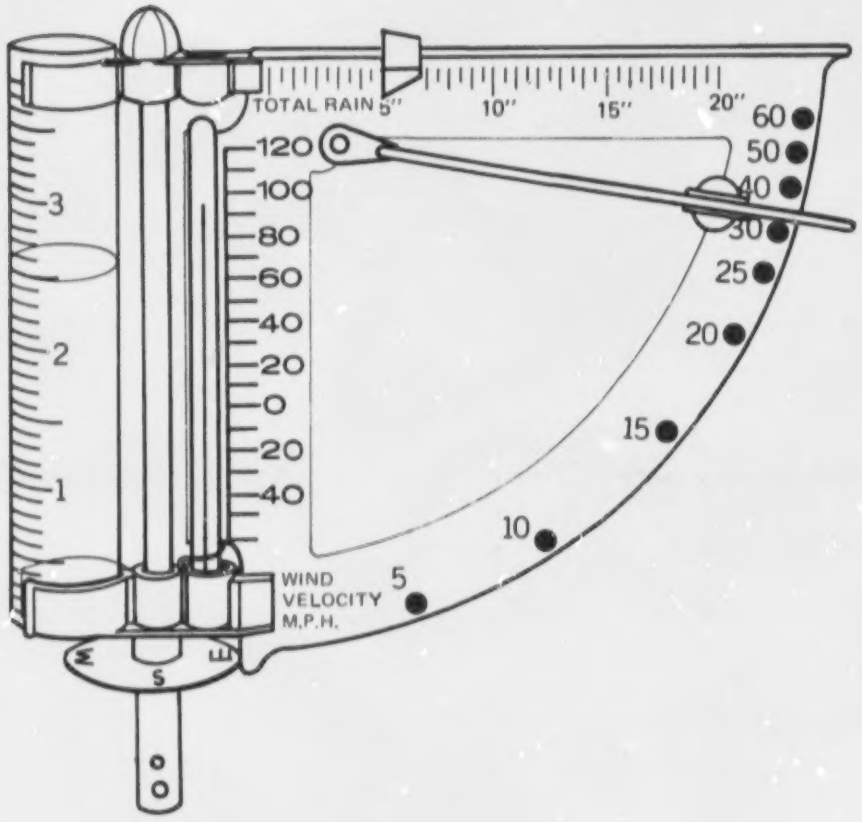
The following variables are involved in weather watching. Which of the variables can be controlled? **WW 01-Core-11C**

a. Cloud type
b. Temperature
c. Wind speed
d. Time of day you take the readings
e. Amount of precipitation

You were told to make your weather-watch measurements at the same time each day. State why it is important to do so. **WW 01-Core-12C**

WW
01-Core-13C

Look at the diagram of the weather instrument below to answer the three questions that follow.

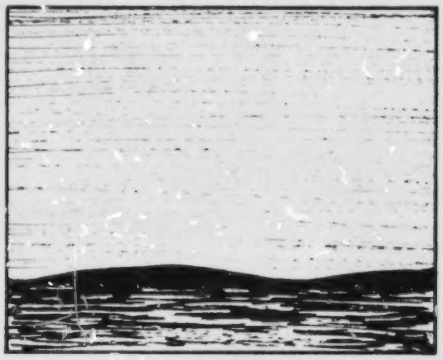


1. What is the wind speed?
2. What is the wind direction?
3. How much precipitation has there been since the last reading?

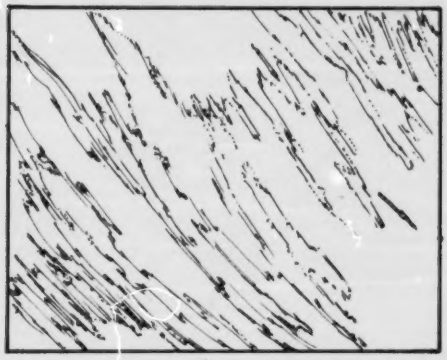
Identify the cloud type shown in each diagram below.

WW
01-Core-14C

Cloud Type 1.



Cloud Type 2.



Cloud Type 3.

Draw the symbols that are used to indicate the amounts of cloud cover listed below.

1. 50% overcast
2. 25% overcast

WW
01-Core-15C

WW
01-Core-16C

Draw the cloud-cover symbol which represents the amount of cloud cover on the day the following diagram was drawn.

WW
01-Core-17C

Symbols like ◑ for *50% cloud cover*, °C for *degrees Celsius*, and = for *equals* are often used in science. Why do scientists use symbols?

WW
01-Core-18C

Chris found the depth of snow to be 28 inches in an area in which there had been no drifting. How many inches of rainfall is approximately equivalent to a 28-inch snowfall?

WW
01-Core-19C

Your teacher will observe you for this check when he can.

WW
01-Core-20C

Your teacher will observe you for this check when he can.

WW
01-Core-21C

Your teacher will observe you for this check when he can.

WW
01-Core-22C

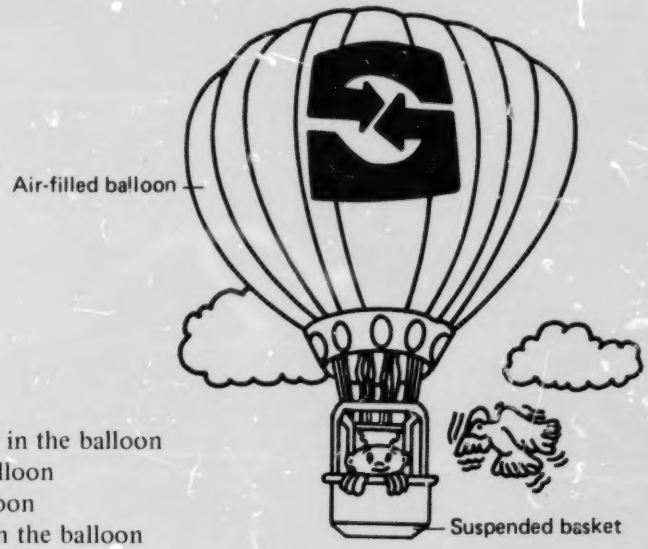
Your teacher will observe you for this check when he can.

WW
01-Core-23C

Your teacher will observe you for this check when he can.

While at a carnival, Cliff decides to take a ride in an air-filled balloon, as shown below. While in flight, Cliff notices that the balloon from which he is suspended in a basket is beginning to descend before the expected end of his ride. What should Cliff look for in the basket to help him?

WW
01-Exc 1-1-1C



a. A valve to release some of the air in the balloon
b. A device to cool the air in the balloon
c. An air pump to blow up the balloon
d. A butane burner to heat the air in the balloon

Suppose a balloon has just been filled with hot air.

WW
01-Exc 1-1-2C

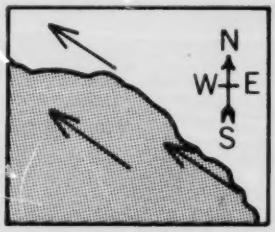
1. Will this balloon have more lifting force when the air surrounding it is warm or when it is cold?
2. Explain your answer.

Describe a plan you could use to measure the relationship between the temperature of the air inside a hot-air balloon and the lifting force of the balloon.

WW
01-Exc 1-1-3C

In the diagram below, arrows show the way the wind is blowing along the coast.

WW
01-Exc 2-1-1C



Which of the following best names the wind direction?

a. NE wind
b. SE wind
c. E wind
d. NW wind
e. W wind

WW
01-Exc 2-1-2C

Suppose that the pointer on your wind-direction instrument keeps moving from NE through N to NW and back to NE again when you try to take a reading. You should

a. record W.
b. record E.
c. record all three directions – NE, N, and NW.
d. record N.
e. wait until the wind direction is steadier before taking a reading.

WW
01-Exc 2-1-3C

On a weekend when no wind-measuring instrument was available, Marietta made the following observations concerning wind speed. Arrange the observations in order of increasing wind speed. List the number of the lowest wind speed first.

1. The branches of the old oak tree sway.
2. A shrub begins to move.
3. The flag hangs limp on her neighbor's flag pole.
4. A pile of leaves from the autumn raking begins to blow around.

WW
01-Exc 2-2-1C

What is the meaning of the prefix *alto* when it is added to the name of a type of cloud?

WW
01-Exc 2-2-2C

Get pictures 1, 3, and 5 from folder WW-01-Exc 2-2-2. Name the type of cloud shown in each picture.

WW
01-Exc 2-3-1C

Use the following table to convert the two temperatures listed below it.

°C	°F	°C	°F	°C	°F	°C	°F
20	68.0	10	50.0	0	32.0	-10	14.0
19	66.2	9	48.2	-1	30.2	-11	12.2
18	64.4	8	46.4	-2	28.4	-12	10.4
17	62.6	7	44.6	-3	26.6	-13	8.6
16	60.8	6	42.8	-4	24.8	-14	6.8
15	59.0	5	41.0	-5	23.0	-15	5.0
14	57.2	4	39.2	-6	21.2	-16	3.2
13	55.4	3	37.4	-7	19.4	-17	1.4
12	53.6	2	35.6	-8	17.6	-18	-0.4
11	51.8	1	33.8	-9	15.8	-19	-2.2

1. How many °F equal -19°C?
2. How many °C equal 48°F?

Change the wind speeds indicated below from miles per hour to kilometers per hour. (HINT: There are 1.6 kilometers in 1 mile.)

WW
01-Exc 2-3-2C

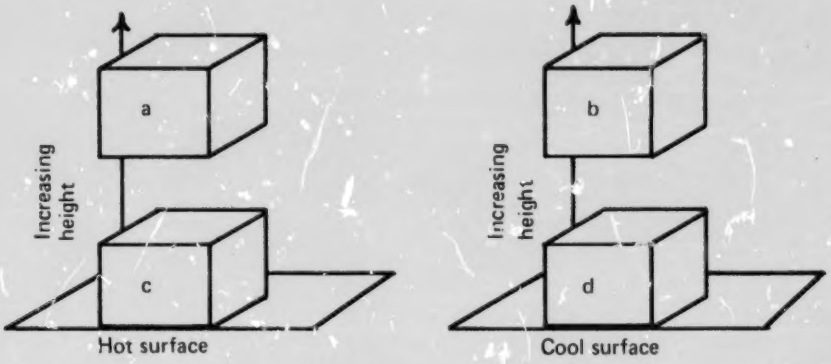
1. 21 mph
2. 62 mph

When Bill checked the rain gauge, he found that 3.1 inches of rain had fallen last night. He knows that there are 2.54 cm in one inch. How many centimeters of rain fell last night?

WW
01-Exc 2-3-3C

Look at the following diagram showing cubes of air over two different surfaces.

WW
02-Core-1C

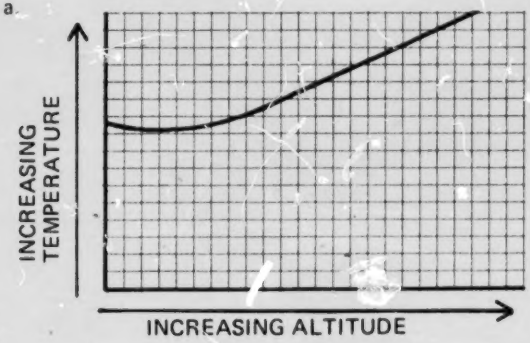


1. Which cube of air will be the hottest?
2. Which cube of air will be the coolest?

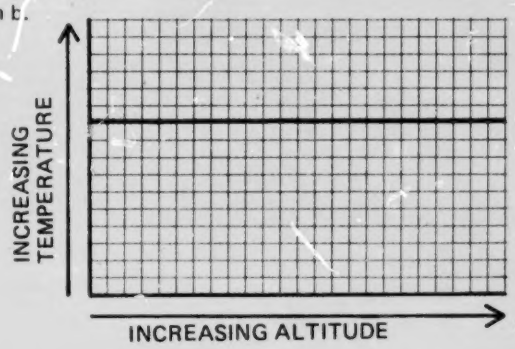
Select the graph below which best shows how air temperature usually changes with altitude above the earth's surface.

WW
02-Core-2C

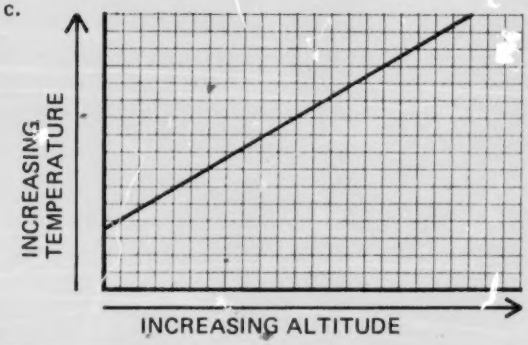
Graph a.



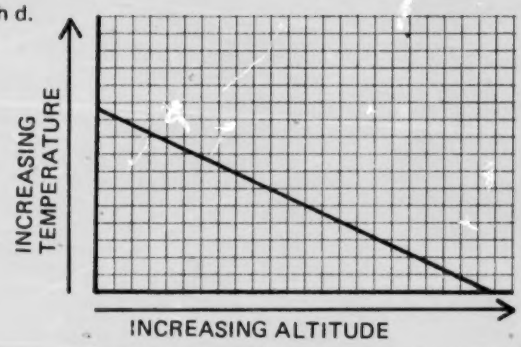
Graph b.



Graph c.



Graph d.



What causes air pressure on an object at the earth's surface?

WW
02-Core-3C

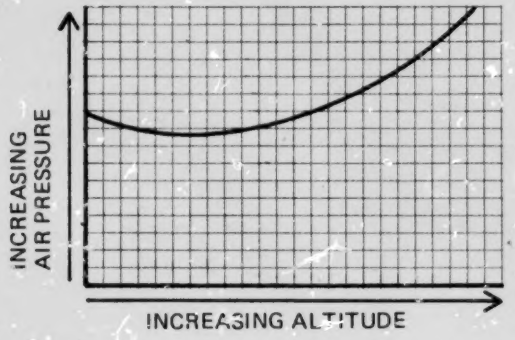
WW
02-Core-4C

Air pressure is usually measured in terms of the height of a column of mercury. What is air pressure that causes it to support a column of mercury?

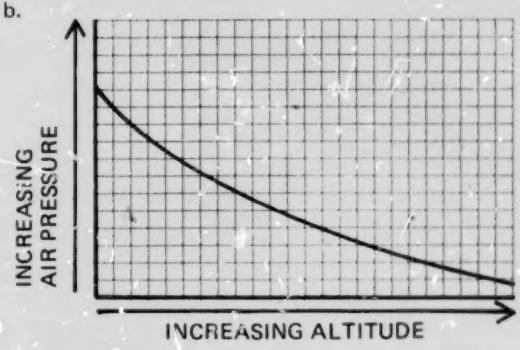
WW
02-Core-5C

Select the graph below which best shows how air pressure usually changes with altitude above the earth's surface.

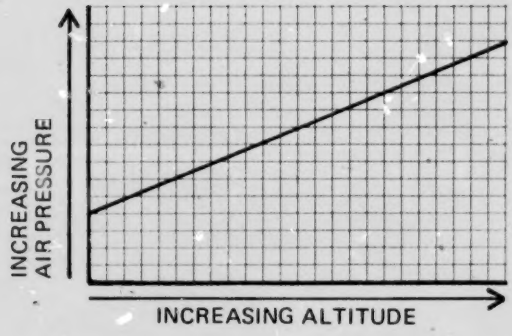
Graph a.



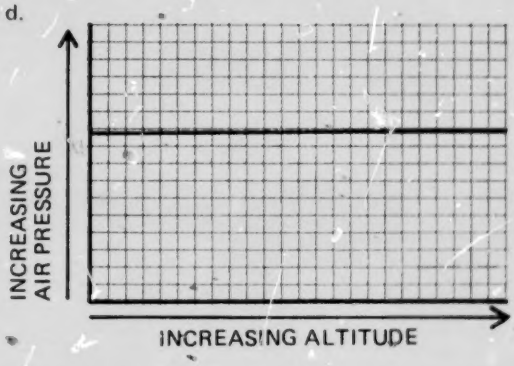
Graph b.



Graph c.



Graph d.



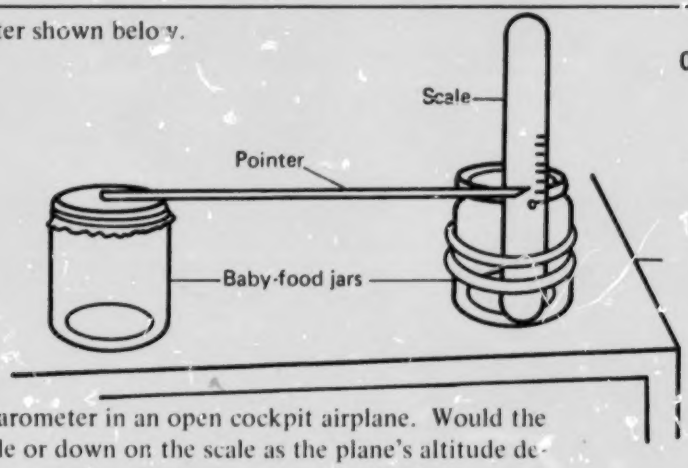
WW
02-Core-6C

John found that air pressure measured by a barometer on the top of a high mountain is less than air pressure measured at sea level because

a. there are fewer air particles at higher altitudes.
b. there is less air above the air on the top of the mountain than there is above the air at sea level.
c. air particles are moving more slowly at higher altitudes.
d. the air is cooler at higher altitudes.

Bob built the baby-food jar barometer shown below.

WW
02-Core-7C



1. Suppose Bob took this barometer in an open cockpit airplane. Would the pointer move up on the scale or down on the scale as the plane's altitude decreased during landing? (Assume that the temperature remained constant.)
2. Explain your answer.

Each jar shown below is capped with the end of a rubber balloon. Match the best description of the relationship between the pressure inside the jar and the pressure outside the jar with each diagram. Write the number of the diagram and after it the letter of the matching description.

WW
02-Core-8C

Diagram

1. Flat

2. Bulged out

3. Dished in

Description

a. Pressure inside equal to pressure outside
b. Pressure inside less than pressure outside
c. Pressure outside less than pressure inside
d. None of these

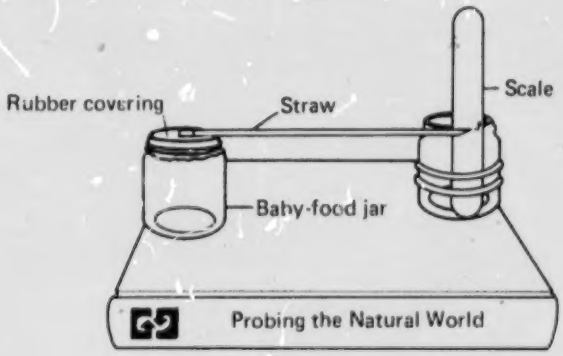
WW
02-Core-9C

Judy found an old tin can that had been destroyed because there was too much pressure difference between the air inside and the air outside the can. Her diagram of the can is shown below.

1. Was the air pressure inside greater or less than the air pressure outside?
2. What evidence do you have to support your decision?

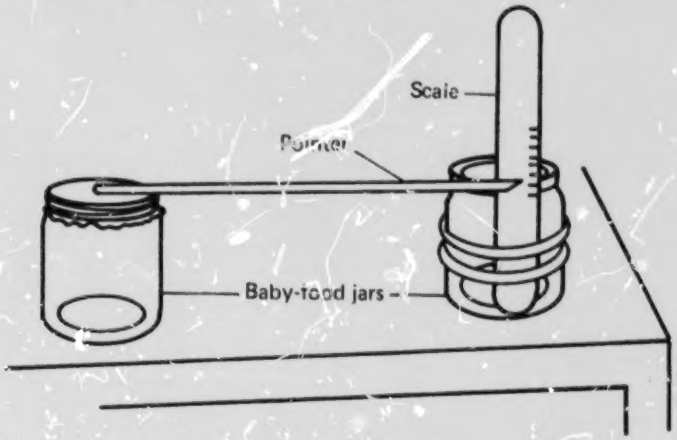
WW
02-Core-10C

You made a barometer like the one shown below. Explain why it's a good idea to attach a straw to the rubber covering of the baby-food jar barometer.



Tom built the baby-food jar barometer shown below and set it up outside. He read the barometer on a warm afternoon. He read the barometer the next night when it was cool outside. The reading was the same as it had been the day before.

WW
02-Core-11C



1. Had the air pressure outside increased, decreased, or stayed the same?
2. Explain the reason for your answer.

Phil and Donny were having an argument. Phil believed that the moisture which collects on the outside of a cold glass of water comes from inside the glass. He thinks that the water seeps through the sides of the glass. State a way Donny could use to show Phil that the water does not come from inside.

WW
02-Core-12C

Define the term *dew point*.

WW
02-Core-13C

What does the term *relative humidity* mean?

WW
02-Core-14C

Ask your teacher to watch you do this check. Get the sling psychrometer. Measure the relative humidity in your classroom. You may use Table 4-2 on page 44 of *Winds and Weather*.

WW
02-Core-15C

Calculate the relative humidity on the basis of the following information.

WW
02-Core-16C

Temperature = 25°C

Greatest amount of water vapor which can be held in 1000 ml of air at 25°C = 23 milligrams

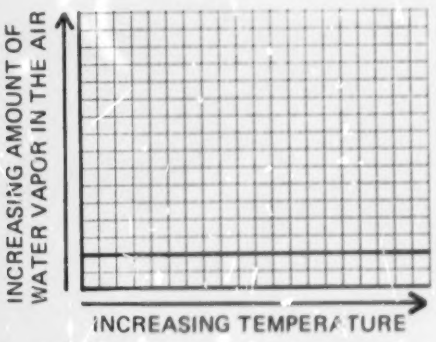
Actual amount of water vapor in this 1000 ml of water =13 milligrams

---

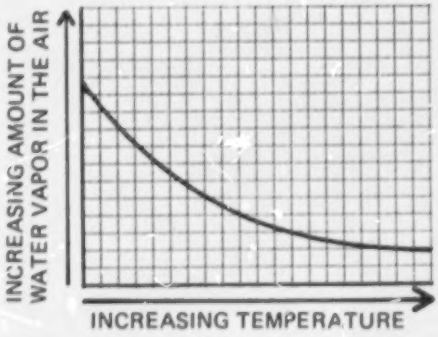
WW
02-Core-17C

Examine the graphs below. Which one best illustrates how the greatest amount of water vapor that air can hold varies with temperature?

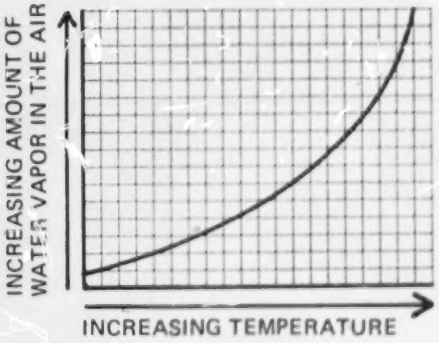
Graph a.



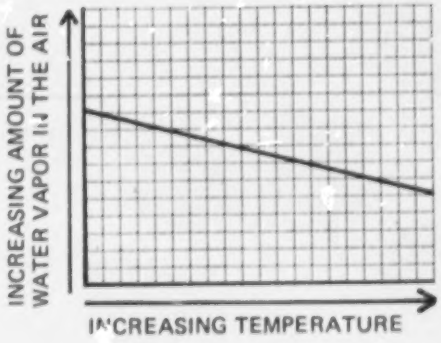
Graph b.



Graph c.



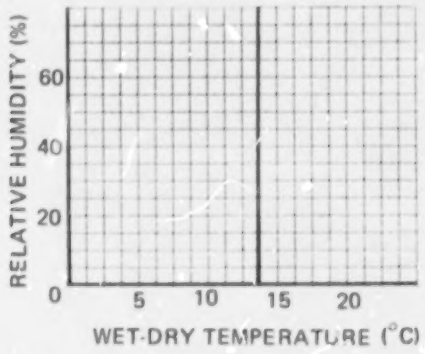
Graph d.



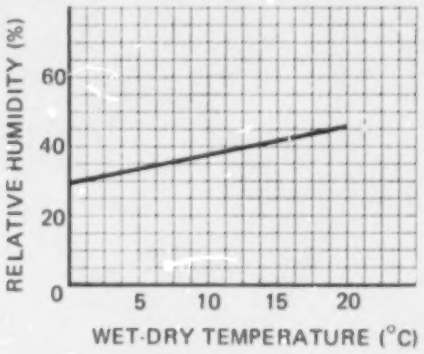
While in lab one day, Pete heated a sample of air so that its temperature increased but the amount of water vapor in it remained the same. Select the graph below that best shows how the relative humidity would change with temperature.

WW
02-Core-18C

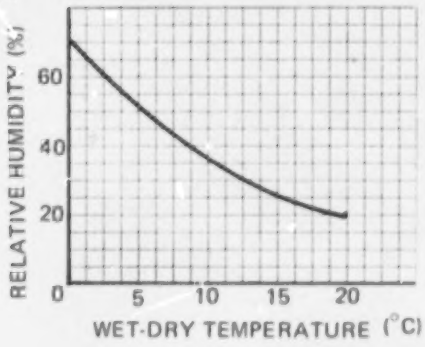
Graph a.



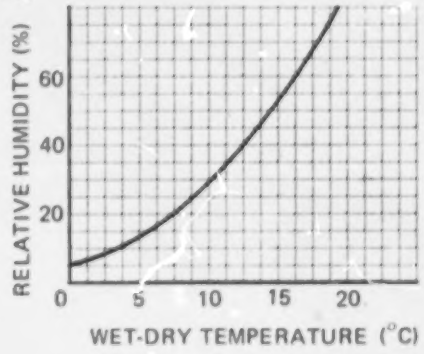
Graph b.



Graph c.



Graph d.



Les measured the wet-bulb and dry-bulb temperatures on Thursday and found the difference was 6°.

WW
02-Core-19C

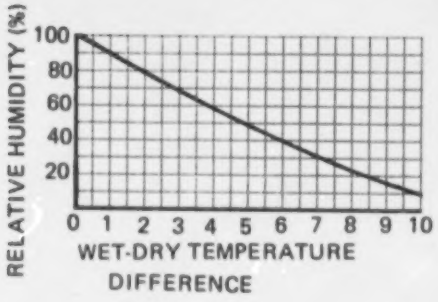
Friday, Marie measured them and found that the difference was 4°.

1. On which of the two days was the relative humidity higher?
2. Explain your answer.

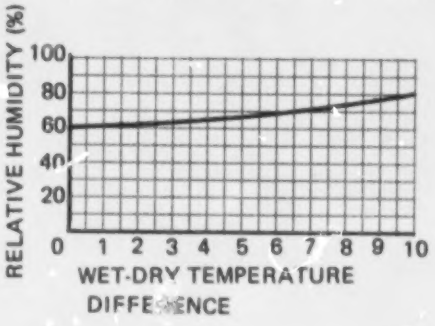
WW
02-Core-20C

For ten days in a row, Olga's dry-bulb reading of her sling psychrometer was unchanged. Yet, each day her wet-bulb reading changed, giving her a greater difference between the two temperatures. She made a graph showing both the daily relative humidity and the difference between her wet-bulb and dry-bulb temperature readings. Select the letter of the graph below which best shows the relationship she found.

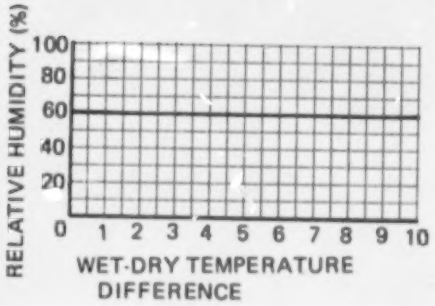
Graph a.



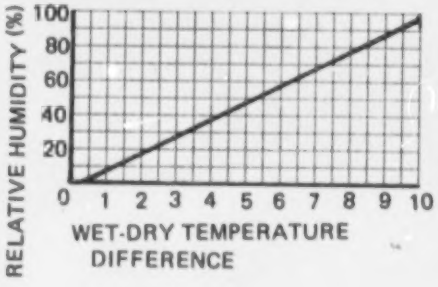
Graph b.



Graph c.



Graph d.



WW
02-Core-21C

Ask your teacher to watch you do this check. Use the sling psychrometer to measure the dew point of your classroom. You may use Table 4-3 on page 46 of *Winds and Weather*.

WW
02-Core-22C

State why there must be solid particles in the air in order for clouds to form.

WW
02-Exc 3-1-1C

Which of the following could be measures of pressure?

a. 10 pounds per square inch
b. 25 newtons per square centimeter
c. 15 pounds
d. 51 feet
e. 80 newtons
f. 50 pounds per square foot

A tightrope walker at the circus weighs 480 newtons. When he stands on the rope, his weight is distributed over 20 square cm of the rope's surface. What pressure does he exert on the rope under his feet? (Be sure to express your answer in the proper units.)

WW
02-Exc 3-1-2C

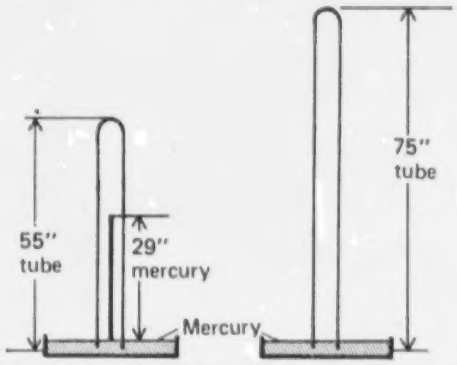
Which exerts the greater pressure, the weight of a 150-pound woman exerted on the high heel of her shoe which has an area of 1.5 square inches or the weight of a 90-pound ice skater exerted on the blade of the skate whose area is 2 square inches?

WW
02-Exc 3-1-3C

In science class, Slim made a mercury barometer from a glass tube 55 inches long. He made another mercury barometer 75 inches long from tubing of the same diameter. Then he measured the height of the mercury column in each tube. The height of the mercury column in the 55-inch tube was 29 inches. Select the answer below which best indicates the height of the mercury column in the 75-inch glass tube.

WW
02-Exc 3-2-1C

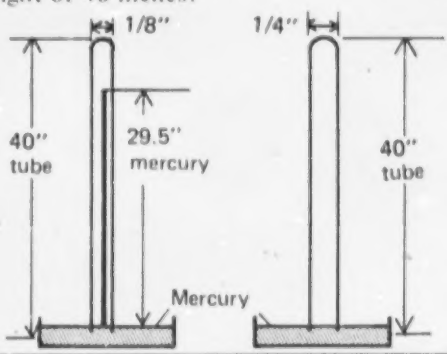
a. 29 inches
b. 75 inches
c. 55 inches
d. 16 inches
e. 14.5 inches



Look at the diagram below. Wendy used a glass tube with a diameter of 1/8 inch and a height of 40 inches to make a mercury barometer. The mercury column in her tube today is 29.5 inches high. How high would the mercury column be today in a barometer tube with a diameter of 1/4 inch and a height of 40 inches?

WW
02-Exc 3-2-2C

a. 29 inches
b. 59 inches
c. 14.8 inches
d. 30 inches
e. 29.5 inches

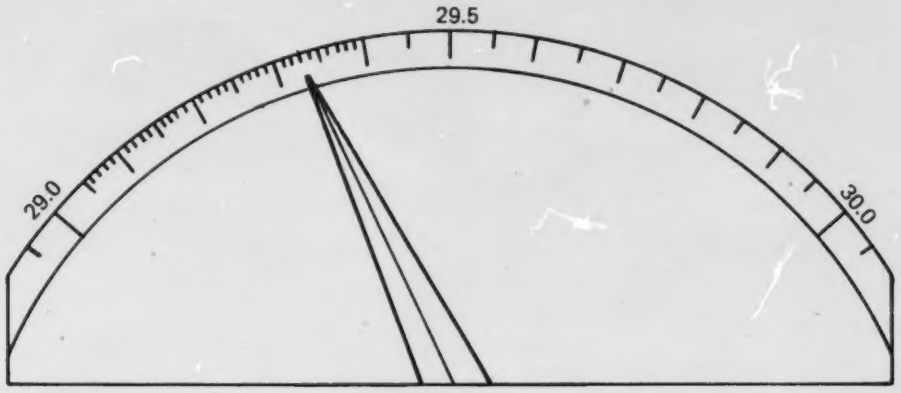


One millibar of pressure is 0.0145 pounds per square inch of pressure. An air pressure of 1016 millibars is required to support a mercury column 30 inches high. What air pressure, in pounds per square inch, is required to support a column of mercury 18 inches high?

WW
02-Exc 3-2-3C

WW
02-Exc 3-2-4C

What is the barometric pressure shown below?



WW
02-Exc 4-1-1C

Gary wet the wick of a wet-bulb thermometer with water. Gordon wet the wick of another wet-bulb thermometer with alcohol. Each ISCS student waved his thermometer around for 15 seconds.

1. Which thermometer will register the lower temperature after being waved?
2. Explain your answer.

WW
02-Exc 4-1-2C

Skeeter and Joe each had a dry-bulb thermometer. Joe placed his thermometer on a desk while Skeeter waved his around rapidly for 15 seconds.

1. Which thermometer would have registered the lower temperature?
2. Explain your answer.

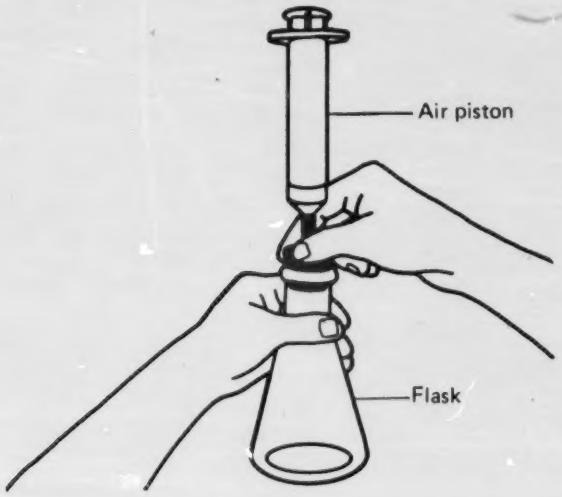
WW
02-Exc 4-1-3C

Skip and Bob each had a wet-bulb thermometer. They both wet the wicks of the thermometers with water. Bob held his still, but Skip waved his in the air for 15 seconds.

1. Which thermometer registered the lower temperature?
2. Explain your answer.

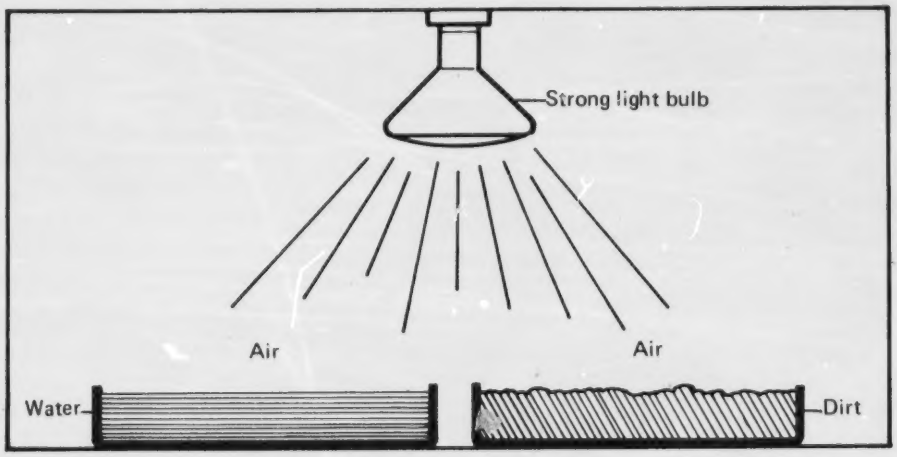
WW
03-Core-1C

During his science class, Glenn set up the apparatus shown below and formed a mist without any trouble. A few days later when Meredith tried to do the same activity, she had great difficulty. In order for her to get any mist at all to form, she first had to cool the flask with cold water. Why might Meredith have had trouble forming a mist when Glen did not?



WW
03-Core-2C

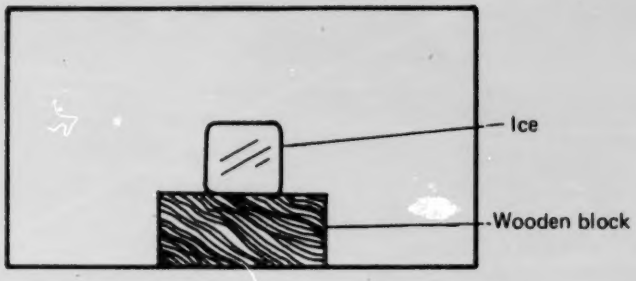
Betsy set up the materials shown below. She turned the light on for 5 minutes and then measured the temperature of the air 4 cm above the surface of the water and of the air 4 cm above the surface of the dirt.



1. Is the air warmer above the water or above the dirt?
2. Explain your answer.

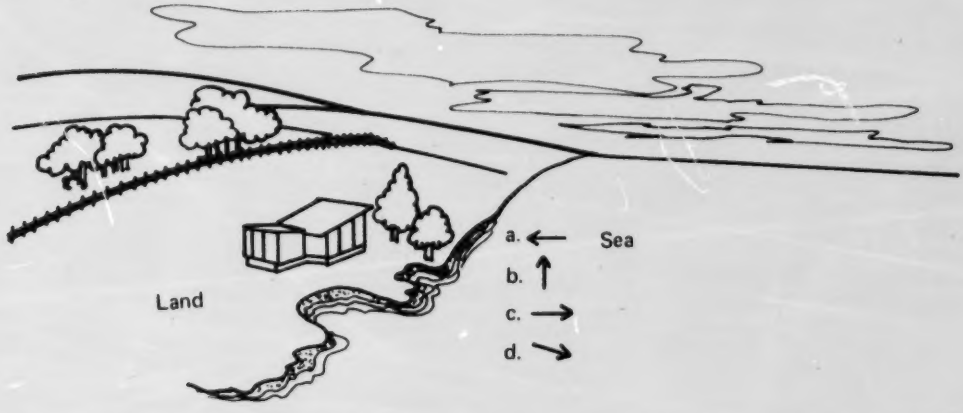
WW
03-Core-3C

Mrs. Jones, a ninth grade science teacher, placed a piece of ice on a wooden block in the observation box as shown below. Copy the diagram onto your answer sheet, or get a copy of it from your teacher. Then draw arrows to indicate the direction of motion of the air throughout the entire box.



WW
03-Core-4C

The diagram below shows a house built by the seashore. Select the arrow that best indicates the wind direction on a hot, sunny day.



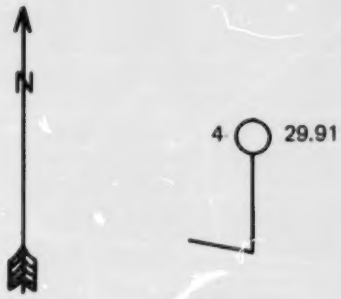
WW
03-Core-5C

On the shore of a very large lake on a warm summer day, there is generally a cool breeze blowing onto the land from over the lake. Which statement below explains the reason for this cool breeze?

a. The cooler air above the lake moves in over the land surface, causing the warmer air over the land to rise.
b. There is less air over the lake than over the land.
c. The air over the lake is warmer than the air over the land.
d. The relative humidity in the air above the land is greater than in the air above the lake.
e. The waves on the lake cause the air to be blown over the land.

WW
03-Core-6C

WIND SPEED (in mph)	WIND SPEED SYMBOL
Less than 1	
1-3	
4-7	
8-12	
13-18	
19-24	
25-31	



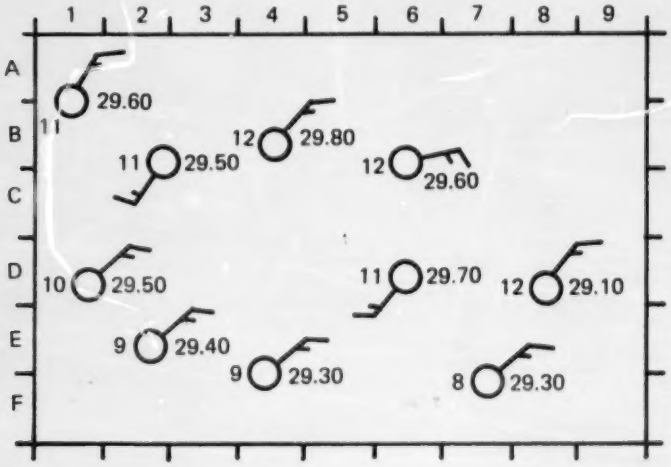
Use the information above to help interpret the weather map symbol shown next to the arrow. Then answer the four questions about the symbol.

1. What is the temperature?
2. What is the air pressure?
3. What is the wind direction?
4. What is the wind speed?

WW
03-Core-7C

Use the horizontal and vertical scales on the weather map shown below to answer the two questions.

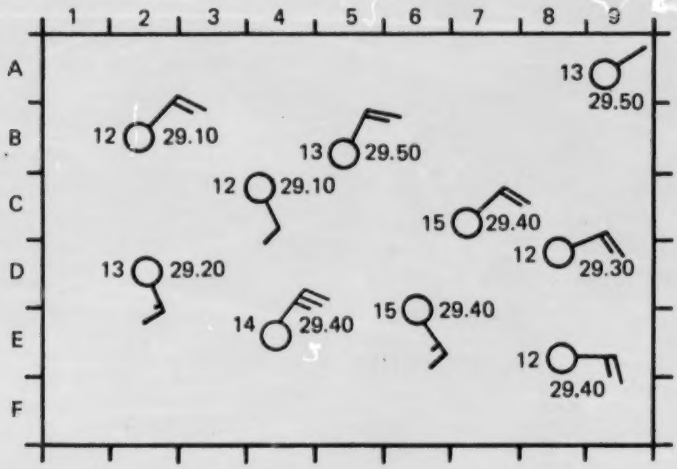
1. Which weather station reported the highest air pressure?
2. Which weather station reported the lowest air pressure?



WW
03-Core-8C

Use the horizontal and vertical scales on the weather map shown below to answer the two questions.

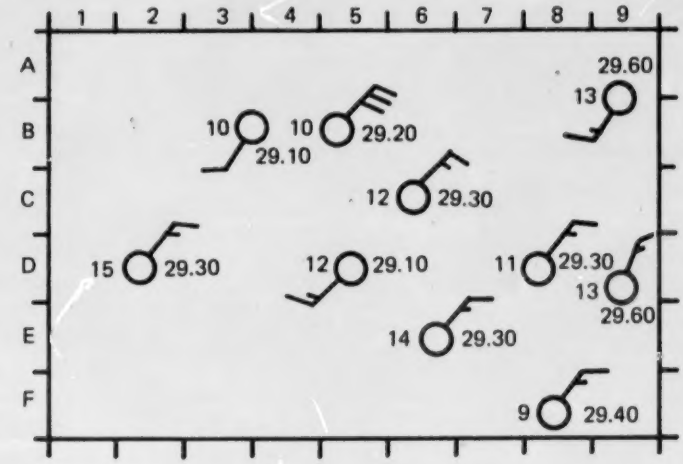
1. Which weather station reported the highest wind speed?
2. Which weather station reported the lowest wind speed?



WW
03-Core-9C

Use the horizontal and vertical scales on the weather map shown below to answer the two questions.

1. Which weather station reported the highest temperature?
2. Which weather station reported the lowest temperature?

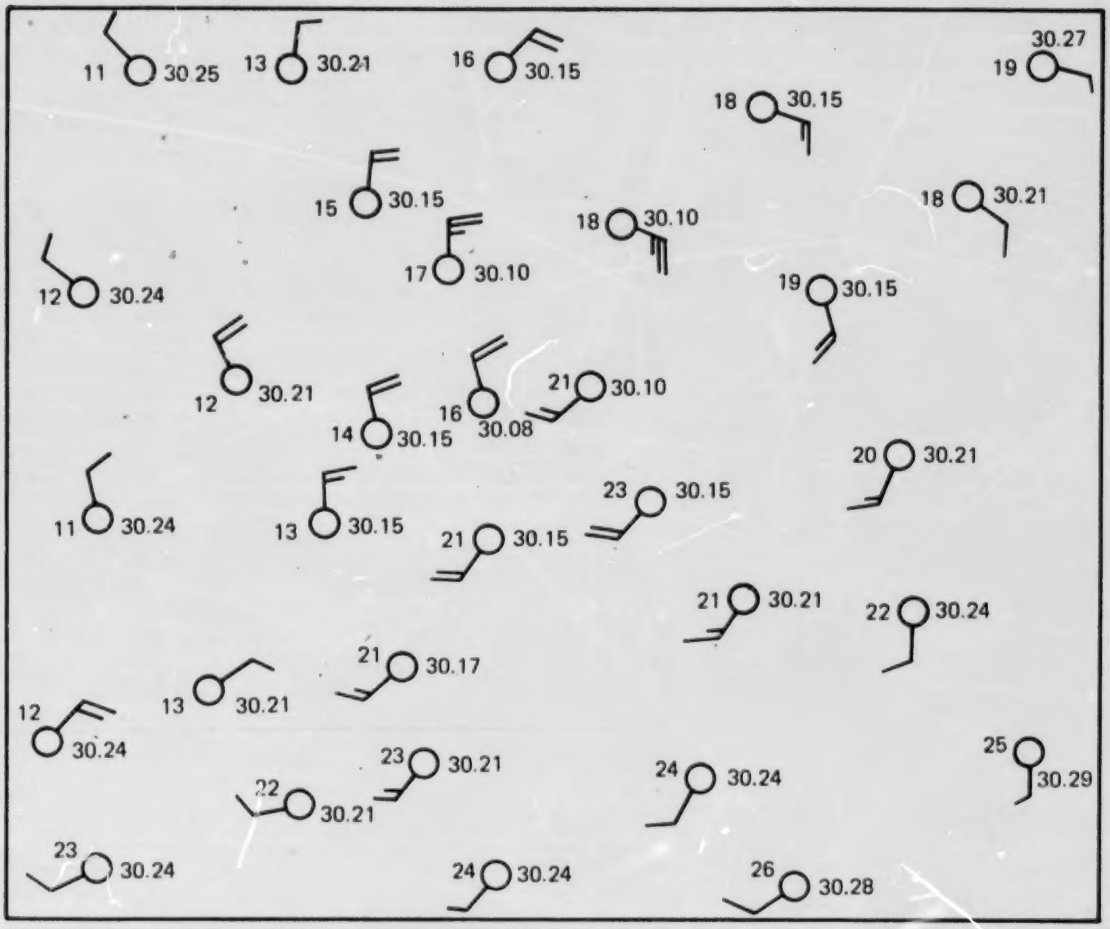


Many weather forecasters use isobars in making their forecasts. Define the term *isobar.*

WW
03-Core-10C

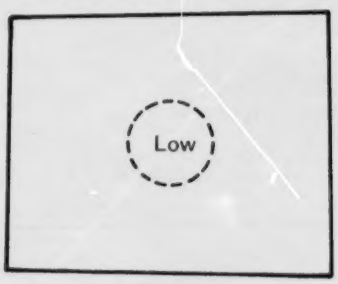
Get a copy of the weather map shown below from your teacher. Draw in two isobars on your copy of the weather map.

WW
03-Core-11C



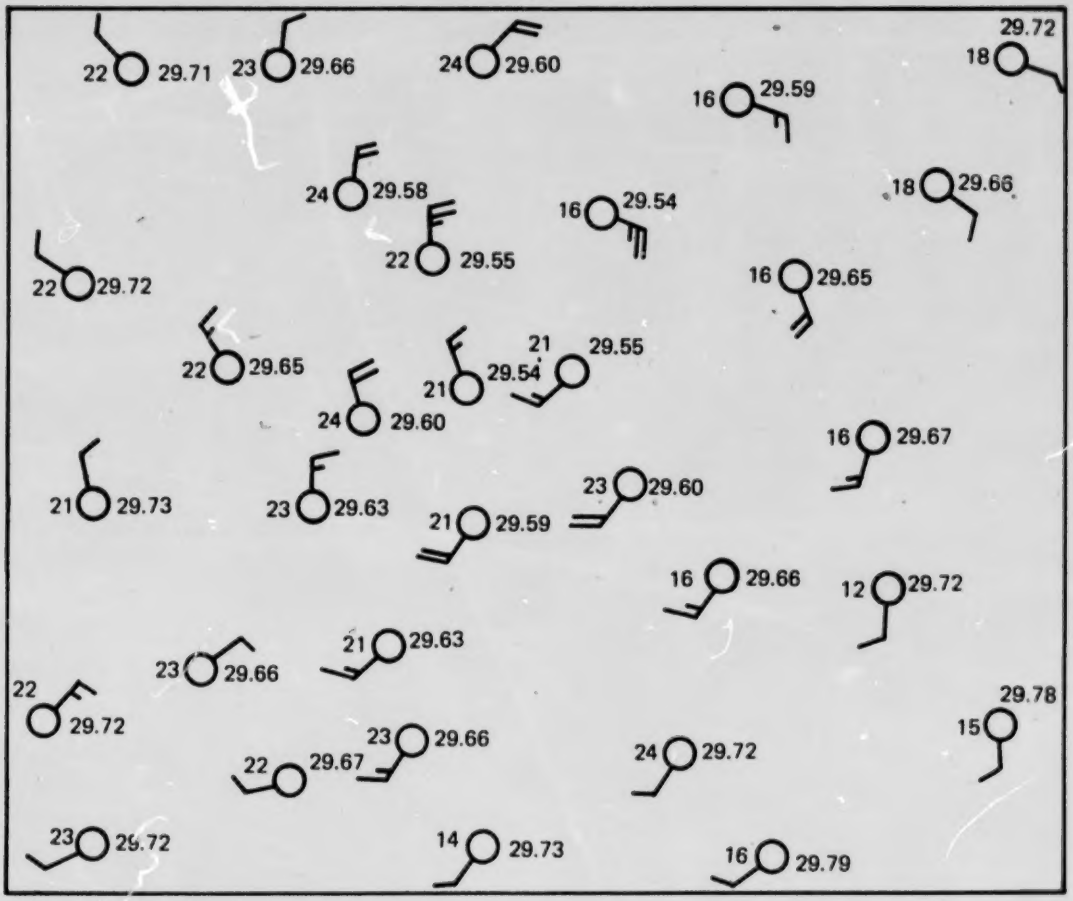
Copy the map of the state of Wyoming shown below. The map shows a low pressure area near the middle of the state. Use arrows to indicate the directions of the wind over the state when the low pressure area is present.

WW
03-Core-12C



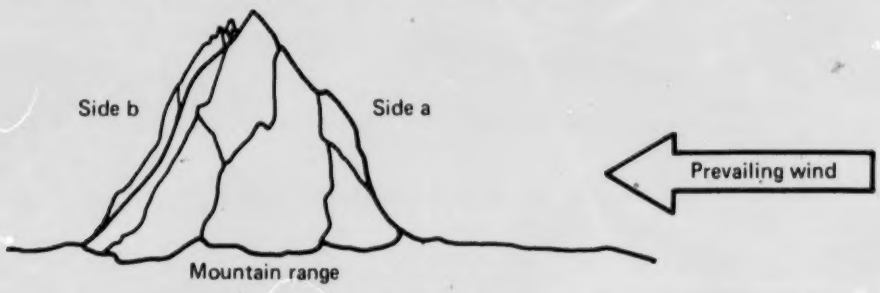
WW
03-Core-13C

Ask your teacher for a copy of the weather map shown below. Use the information on the map to determine in which areas you would expect to find overcast skies. Shade in those overcast areas on your copy of the weather map.



WW
03-Core-14C

Examine the diagram of the mountain range shown below.



1. Which side of the mountain range, a or b, will receive more rainfall?
2. Explain your answer.

State three of the major causes of the uplifting of air.

WW
03-Core-15C

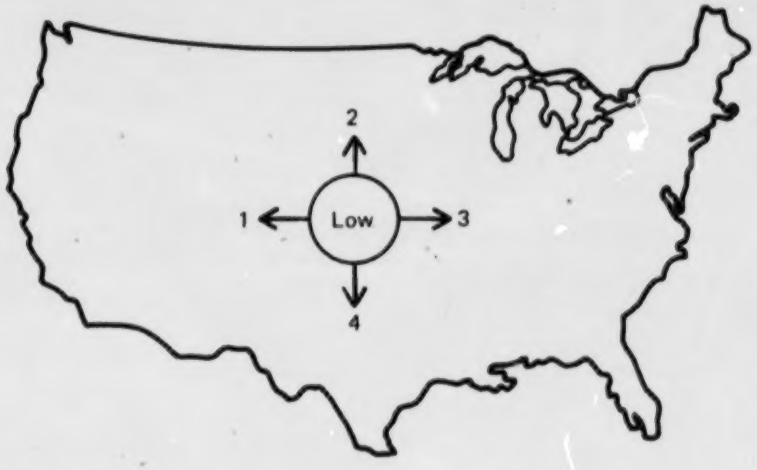
Name each of the weather map symbols below.

WW
03-Core-16C

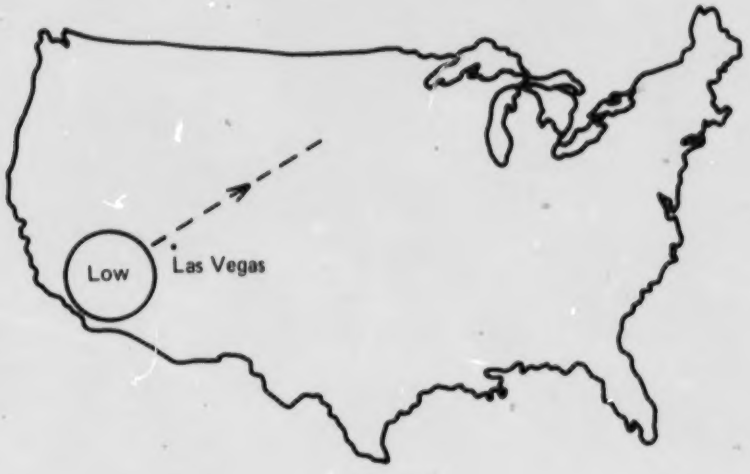
From the list below, select the option that shows the most likely direction of movement on the map of the low pressure area.

WW
03-Core-17C

a. Arrow 1
b. Arrow 2
c. Arrow 3
d. Arrow 4
e. All of the directions shown are equally likely.



The weather map below shows a low pressure area approaching Las Vegas.



List the letters of all the changes in the weather you would expect as the low pressure area approaches.

a. The barometric pressure will drop.
b. The sky will cloud over.
c. The wind will shift until it is blowing from the north.
d. The temperature will drop.
e. The wind will shift until it is blowing from the southwest.

The weather map below shows a cold front approaching Denver, Colorado.

WW
03-Core-19C

Select the weather changes you would expect to occur as the cold front approaches and passes through.

a. As the cold front approaches, the sky will cloud over, primarily with cumulus and cumulonimbus clouds.
b. The temperature will drop as the cold front passes through.
c. The wind will shift so it blows from the southwest as the cold front passes through.
d. The barometer will fall as the cold front approaches, and then rise as the cold front passes through.
e. There will be many cirrus clouds in the sky.

WW
03-Core-20C

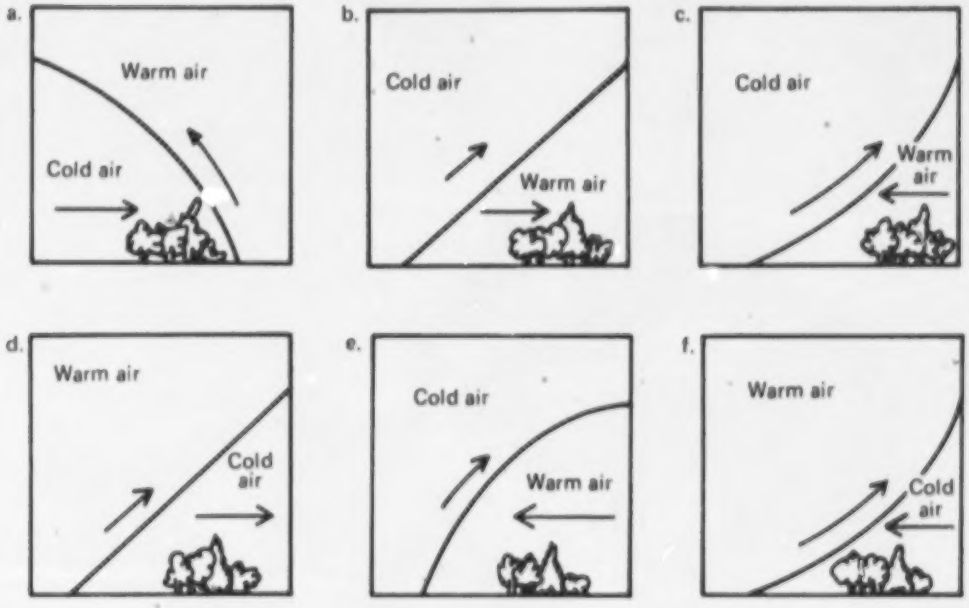
The weather map below shows a warm front approaching Bakersfield, California.

List the letters of all the weather changes you would expect as the warm front approaches and passes through.

a. The temperature will rise as the warm front passes through.
b. The barometric pressure will fall as the warm front approaches and passes through.
c. There will be a south wind as the warm front approaches.
d. As the warm front approaches, the sky will cloud over with cumulus and cumulonimbus clouds.
e. The barometric pressure will rise as the warm front approaches and passes through.

The arrows in the diagrams below represent the directions of air movement. **WW 03-Core-21C**

1. Which diagram best represents a warm front?
2. Which diagram best represents a cold front?



Andrea measured the air temperature at the earth's surface. It was 28.1°C. She knows that the air temperature decreases at an average rate of about 1.0°C per 100 m. Calculate the air temperature at an altitude of 780 m above the earth's surface at the time Andrea took her measurement. **WW 03-Exc 5-1-1C**

Cindy measured the dew point at the earth's surface. It is 14.5°C. She knows that the dew point of air decreases at an average rate of 1.0°C per 550 m. Calculate the dew point at 1280 m above the earth's surface when Cindy took her measurement. **WW 03-Exc 5-1-2C**

Mason made the following measurements on July 13. **WW 03-Exc 5-1-3C**

Temperature, using dry-bulb thermometer = 25°C
Temperature, using wet-bulb thermometer = 10°C

He used these measurements to find that the relative humidity was 8% and the dew point was 11°C. The height of the cloud bottoms can be obtained using the following formula:

$$\text{Height of cloud bottom in meters} = 122\,(T_{air} - T_{dew\ point})$$

Use Mason's information to calculate the height of the cloud bottoms on July 13.

WW
03-Exc 5-2-1C

Archie wants to measure the speed of clouds by using a nephoscope. Which of the following measurements must he make?

a. The height of a cloud
b. The height of his eye above the nephoscope
c. The radius of the nephoscope circle
d. The time required for the cloud to travel from the center to the edge of the nephoscope circle
e. All of the measurements listed in a, b, c, and d
f. Only the measurements listed in a, b, and d

WW
03-Exc 5-2-2C

Sue wants to use the following formulas to calculate the speed of the clouds.

$$D = \frac{H \times d}{h} \qquad \text{and} \qquad S = \frac{D}{t}$$

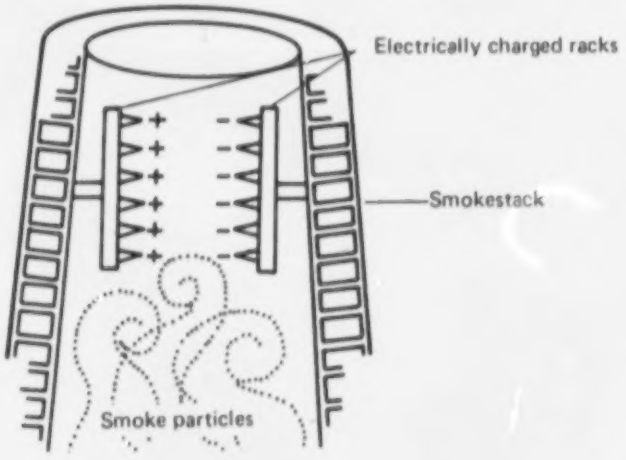
She has made the following measurements

d (radius of nephoscope circle) = 0.03 meters
h (height of eye above nephoscope) = 0.4 meters
H (estimated height of cloud) = 1400 meters
t (time for cloud to move from center to edge of nephoscope circle) = 8 seconds

Use Sue's measurements to determine the speed (S) of the clouds.

WW
03-Exc 7-1-1C

A factory has just installed in its smokestacks the new device shown below. What effect will these large, electrically charged racks have on the smoke particles? Select the letter of the best possible answer from the list below.



a. Keep rain from entering the stack
b. Stop all gases from going up the stack
c. Get the smoke out of the stack faster
d. Remove the color from the smoke
e. Cause small particles to clump together

One technique used by scientists to make rain when they want it is to drop millions of tiny crystals of dry ice into clouds from an airplane. Dry ice is very cold, about -73°C. How is it possible to cause rain by dropping dry ice into a cloud?

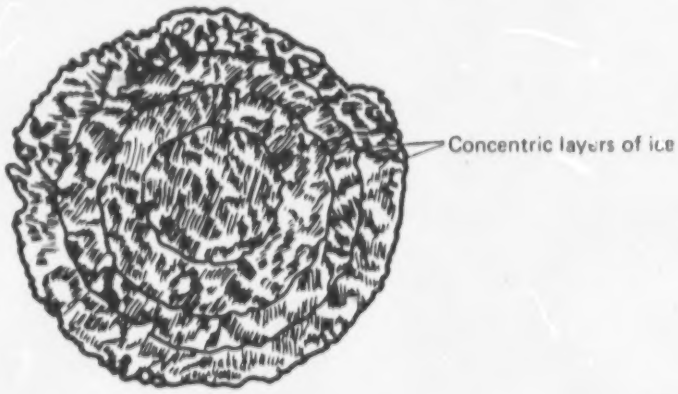
WW
03-Exc 7-1-2C

Why do cumulus clouds generally not last long but fade away quickly?

WW
03-Exc 7-2-1C

Why do hailstones usually consist of concentric layers of ice as shown below?

WW
03-Exc 7-2-2C



The table below shows the measurements that Hernando made during the last four days. Open *Winds and Weather* to page 165.

WW
03-Exc 7-3-1C

DATE	TIME	TEMP. (in °C)	WIND DIR.	WIND SPEED (in mph)	CLOUD TYPE	CLOUD COVER	PRECIPI-TATION (in inches)	BAR. PRESS. (in inches)	REL. HUM. (in %)	DEW POINT (in °C)
8	10:00	15	SW	25-31	cumulus	◑	--	29.80	36	8
9	10:18	20	S	19-24	stratus	●	--	29.70	27	7
10	9:55	25	S	19-24	stratus	◕	--	29.60	20	6
11	10:10	25	S	8-12	clear	○	--	29.60	20	6

Based on Hernando's data and Table 2 on page 165, answer the following questions to tell what changes will probably occur in the next 24 hours.

1. Will the temperature increase, decrease, or stay constant?
2. Will the relative humidity increase, decrease, or stay constant?
3. Will the sky become cloudier, clearer, or stay the same?
4. Will there be any clouds? If so, name the type.
5. Will there be no, some, or heavy precipitation?
6. Will there be no wind, a light breeze, or a strong wind?

Crusty Problems

CP

Alfred Wegener developed an explanation for the present appearance of the continents on the earth. State his explanation in your own words.

CP
01-Core-1C

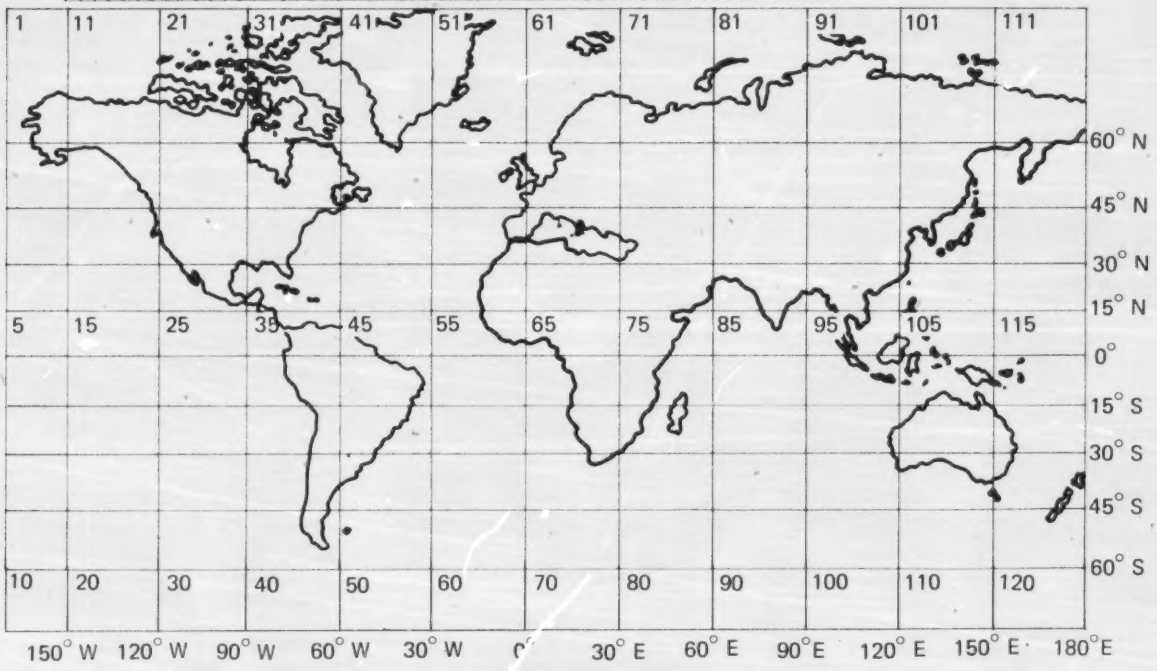
Scientists looked at geologic evidence to decide whether the theory of continental drift was reasonable. List things that scientists would cite as evidence.

CP
01-Core-2C

The data below are from the "Preliminary Determination of Epicenters" table. For each of the four earthquakes, use the map below to determine its location. Write the number of the earthquake and after it the number of the box in which the earthquake is located. Note that the boxes on the map are numbered in order from top to bottom. (For example, box 86, though unnumbered, is the box directly below box 85.)

CP
01-Core-3C

EARTHQUAKE	ORIGIN TIME (GMT)			GEOGRAPHIC COORDINATES		DEPTH (in km)
	Hr	Min	Sec	Lat	Long	
1	05	16	56.2	3.2 S	163.8 E	45
2	05	40	12.7	51.3 N	130.2 W	10
3	16	10	55.4	18.7 S	165.4 E	590
4	16	27	47.7	39.1 S	83.1 E	36



CP
01-Core-4C

The diagrams below show the motions of four plates.

Diagram A

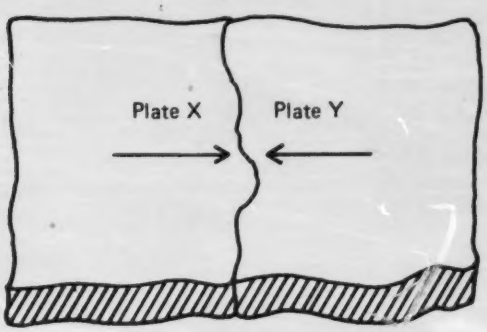
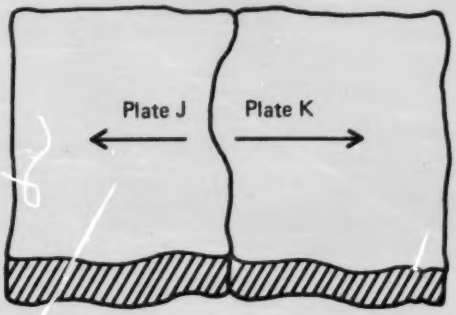


Diagram B



1. Which of the following describe the line between the plates in Diagram A?
   a. It is the source of deep earthquakes.
   b. It is the source of shallow earthquakes.
   c. It is the source of no earthquakes.
   d. It is probably in the middle of an ocean.
   e. It is probably near the edge of a continent.
   f. The line is between colliding plates.
   g. The line is between separating plates.
2. Which of the following describe the line between the plates in Diagram B?
   a. It is the source of deep earthquakes.
   b. It is the source of shallow earthquakes.
   c. It is the source of no earthquakes.
   d. It is probably in the middle of an ocean.
   e. It is probably near the edge of a continent.
   f. The line is between colliding plates.
   g. The line is between separating plates.

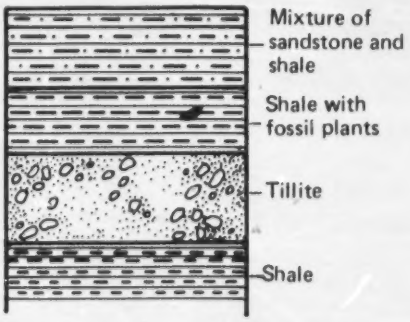
Look at the diagram below.

CP
01-Core-5C

1. Is there any evidence in the diagram that geologic change has occurred?
2. If so, list the processes that caused the change.

Suppose that a 19th century geologist in the Southern Hemisphere found on at least three different continents deposits of rock which were layered like that shown in the diagram below. Each rock sequence included a layer which contained the same kind of fossil plant. Assume you are a geologist and want to find an explanation for this. List two questions whose answers would help you get more information.

CP
01-Core-6C



CP
01-Core-7C

Your teacher will observe you for this check when he can.

CP
01-Core-8C

Your teacher will observe you for this check when he can.

CP
01-Core-9C

Your teacher will observe you for this check when he can.

CP
01-Core-10C

Your teacher will observe you for this check when he can.

CP
01-Core-11C

Your teacher will observe you for this check when he can.

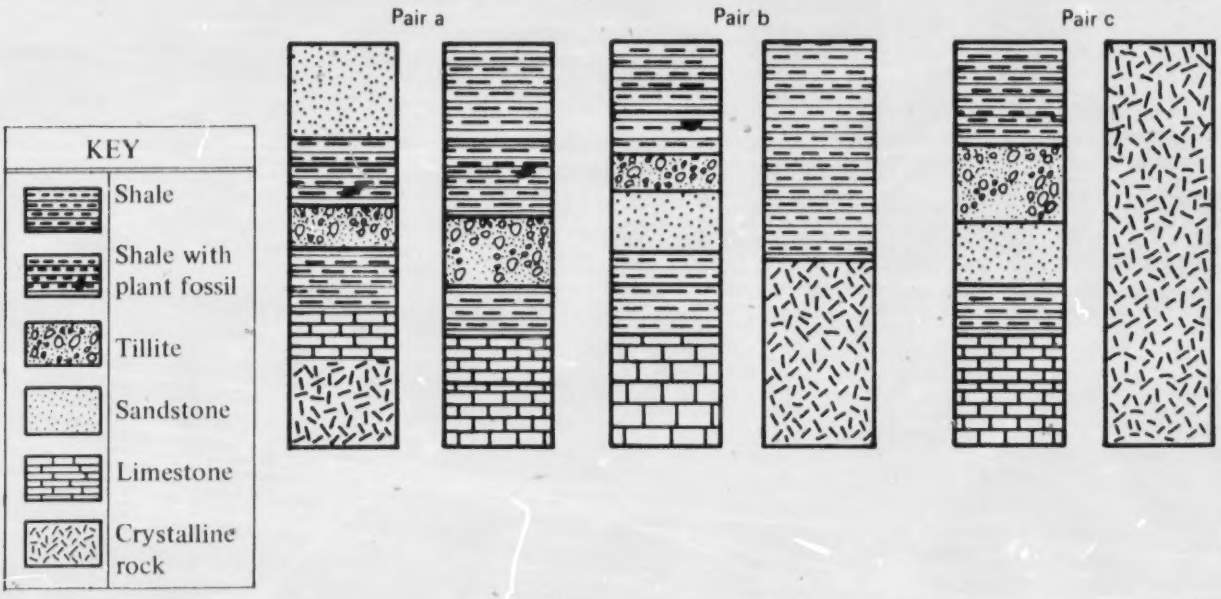
CP
01-Res 1-1C

What evidence do geologists offer from the Ice Age to support their theory of continental drift?

CP
01-Res 2-1C

Study the three pairs of rock sequences below.

1. Select the pair of rock sequences which are evidence that their present locations, now separated by an ocean, were once part of the same landmass.
2. Explain why they indicate this.



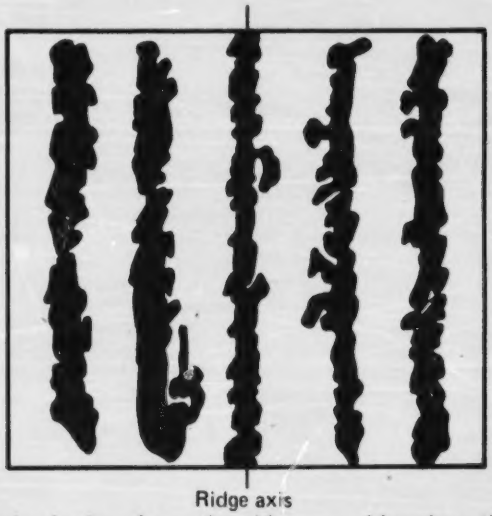
It is useful to consider a baked apple as a model to explain mountain building on the earth. In what way is a baked apple similar to the earth so that it can explain mountain building?

CP
01-Res 3-1C

The diagram below shows the magnetic field recorded in the rocks in an ocean basin. The shaded areas represent rocks on the sea floor that record the earth's magnetic field as it is today. The white areas indicate rocks with a reversed magnetic field. The ridge axis is shown at the center of the diagram.

CP
01-Res 4-1C

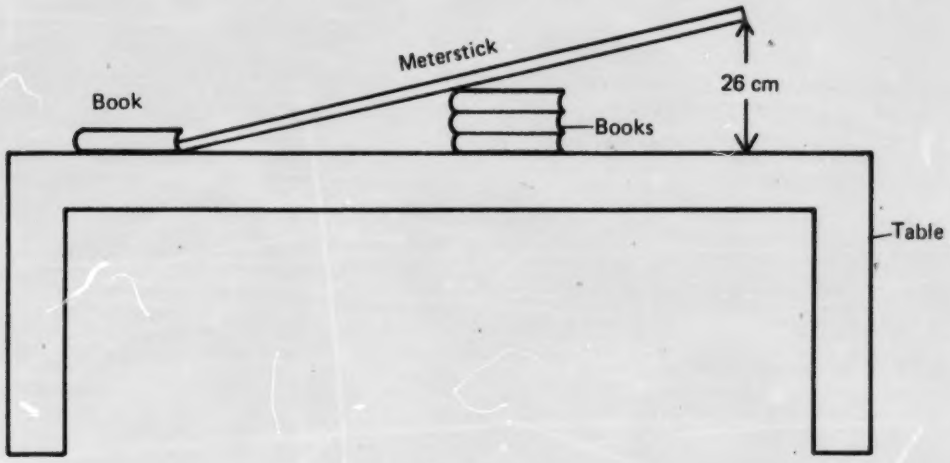
Below are four statements. Some of them are observations, and some are not. List the letter of each statement which is not directly observable in the diagram.



a. The rocks farther from the ridge are older than those near it.
b. The ridge axis appears to bisect the magnetic lines.
c. The sea floor is spreading away from the ridge.
d. Four reversals are recorded in the rocks shown in the diagram.

Get a meterstick, and put several books under one end of it to make the distance between the table and the stick 26 cm at the high end. Keep the other end of the meterstick steady with a book, as shown in the diagram below. Get a clinometer, and measure the dip angle of the meterstick.

CP
02-Core-1C



The five statements listed below refer to cutout block CP-02-Core-2. Get the block from your teacher. The key for the block is given below.

CP
02-Core-2C

KEY	
Symbol	Rock
	sandstone
	shale
	conglomerate
	shale-sandstone

On your answer sheet, write the number of each statement, and after it indicate whether it is an observation or an interpretation. Then, after each statement you labeled as an interpretation, state the observation on which that interpretation is based.

1. The conglomerate layers were formed during a time when conditions changed.
2. There are four rock layers in the section.
3. The sandstone layer is the youngest.
4. The rocks were uplifted and tilted after formation.
5. The rocks are tilted approximately 30°.

CP
02-Core-3C

Get rock H from the CP Rock Check Kit and a hand lens.

1. Is the texture of this rock interlocking or noninterlocking?
2. Give your reason for your answer.

CP
02-Core-4C

Get rock I from the CP Rock Check Kit and a hand lens.

1. Does the rock have interlocking or noninterlocking texture?
2. Give the reason for your answer.

CP
02-Core-5C

Get rock C from the CP Rock Check Kit and a hand lens and a steel nail. Open your textbook to Table 1 on page 47.

1. Is this sample a metamorphic, sedimentary, or igneous rock?
2. State the evidence for your choice.

CP
02-Core-6C

Which of the characteristics below are important in describing a rock's texture?

a. Grain size
b. Cement visible
c. Random grains
d. Interlocking grains
e. None of these
f. All of these

CP
02-Core-7C

Get rock M from the CP Rock Check Kit. It is an igneous rock. Study it.

1. What conditions produced the rock you have?
2. Where in or on the earth's crust do such conditions occur?

CP
02-Core-8C

Select the letter of the mountain type which has the characteristics of a faulted mountain.

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped
b.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped
c.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetrical, parallel slopes
d.	scarp and basin regions	marine sediments, may be metamorphic	long and wedge-shaped

Get rock samples E, H, J, and L from the CP Rock Check Kit. Below is a list of environments in which the samples may have formed. Write the letter of the rock sample after the number of the environment in which you think it was formed.

CP
02-Core-9C

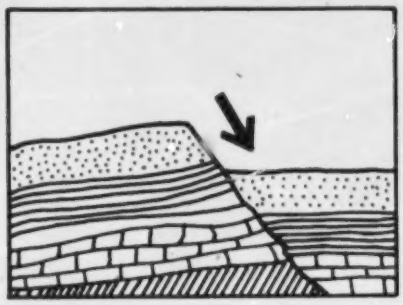
1. In an ocean basin
2. In a pool of molten rock deep within the crust
3. In solid rock of the crust, under pressure
4. From the flow of volcanic material

Look at the photograph of Death Valley in Figure 2-7 on page 36.

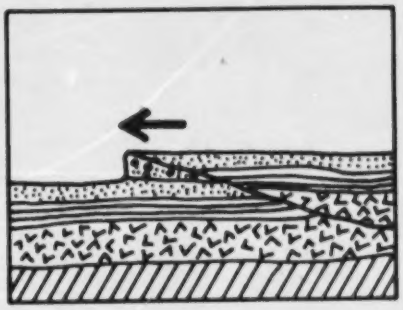
CP
02-Core-10C

1. Identify the diagram below which shows the way Death Valley was formed.
2. Give two pieces of evidence for your choice.

a.

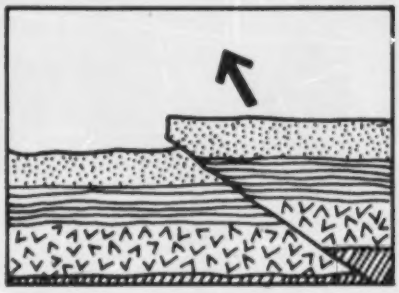


b.



c.

d.



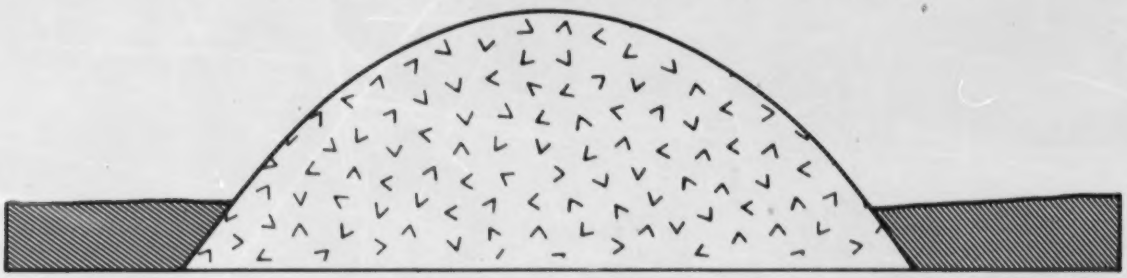
CP
02-Core-11C

Write the letter of the mountain type which has the characteristics of an erosional mountain. Erosional mountains form when softer surrounding materials erode away.

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped
b.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped
c.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetric, parallel slopes
d.	scarp and basin regions	marine sediments, may be metamorphic	long and wedge-shaped

CP
02-Core-12C

Get rock C from the CP Rock Check Kit. The diagram below shows a cross section of a mountain. If a mountain has the shape shown below and is made entirely of the same rock as your sample, describe how the mountain was formed.



CP
02-Core-13C

In the table below, four types of mountains are described. Write the letter of the mountain type which has the characteristics of folded mountains.

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped
b.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped
c.	scarp and basin regions	marine sediments, may be metamorphic	long and wedge-shaped
d.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetric, parallel slopes

Write the letter of the mountain type which has the characteristics of an old volcanic crater.

CP
02-Core-14C

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped
b.	scarp and basin regions	marine sediments, may be metamorphic	long and wedge-shaped
c.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetric, parallel slopes
d.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped

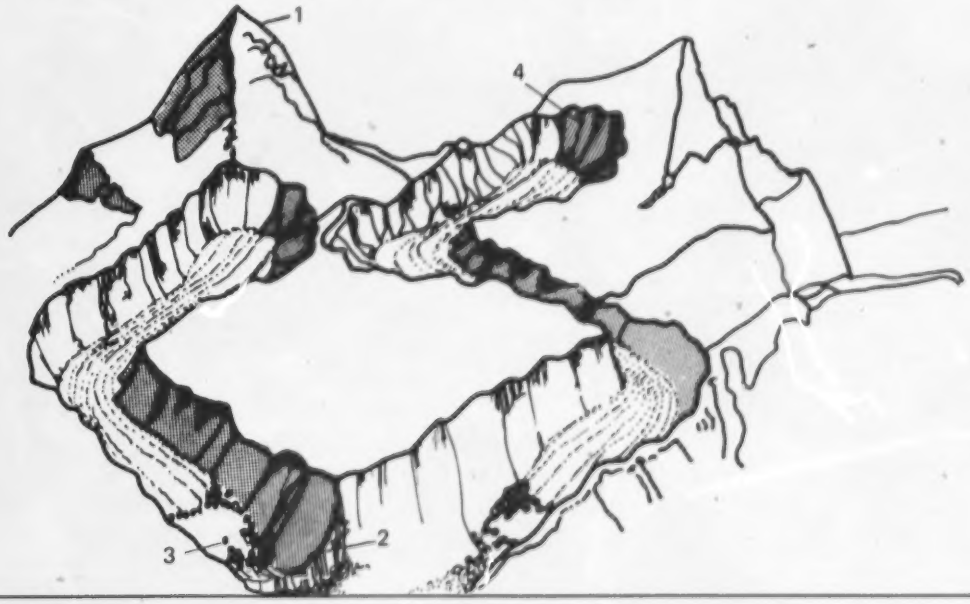
List the letters of any erosional features listed below which were formed by glacial action.

CP
02-Core-15C

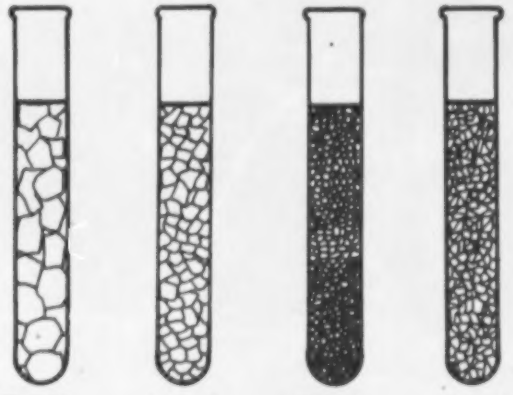
a. Hanging valleys
b. Undercutting
c. Pothole
d. Rock grooves
e. Horn

Examine the diagram below. Four features have been indicated by numbers. Which of these features do you think are depositional and which erosional?

CP
02-Core-16C



CP 02-Core-17C	Get cutout block CP-02-Core-17 from your teacher. What caused the sedimentary layers to deform as shown in the cutout block?
CP 02-Res 5-1C	Get rock samples D, I, and M from the CP Rock Check Kit. Also get a hand lens, a steel nail, and dilute HCl. Open your textbook to the rock test key on pages 45 through 47. Write the letter of each sample, and state if it is igneous, sedimentary, or metamorphic.
CP 02-Res 6-1C	The four test tubes shown below contain the same substance which was cooled from a liquid to a solid at different rates. On your answer sheet list the numbers of the test tubes in the order of the rate from slowest to fastest at which the substances in each was cooled.



CP 02-Res 6-2C	Get a hand lens and, from the CP Rock Check Kit, samples A, G, and L. These are three igneous rocks. Each one cooled and solidified from a molten material. Observe each rock carefully with the hand lens. 1. Using the letter on each, list the rocks in the order that you think they cooled, from fastest cooling to slowest cooling. 2. How did you decide the order?
CP 02-Res 7-1C	Examine the photograph that your teacher has labeled CP-02-Res 7-1C. How was the layer that the arrow points to formed?
CP 02-Res 7-2C	Lionel put a small amount of dilute HCl onto some rocks he had collected. Immediately bubbles appeared on the rocks. 1. Name the rock that reacts with HCl in this way. 2. What are the rocks made of?

Elaine found a rock near her home. She observed that it was composed of one kind of material, and the grains were noninterlocking. She concluded it was sedimentary. Using her "Mineral Classification Chart," she determined that the single visible component was feldspar. She then applied HCl to the rock, and it began to bubble. Since feldspar does not react with HCl, what would cause the HCl to bubble?

CP 02-Res 8-1C

Get cups CP-02-Res 8-2a and CP-02-Res 8-2b. Examine the sand in both cups.

1. What difference do you notice in these two samples?
2. Explain how this difference could occur in nature?

CP 02-Res 8-2C

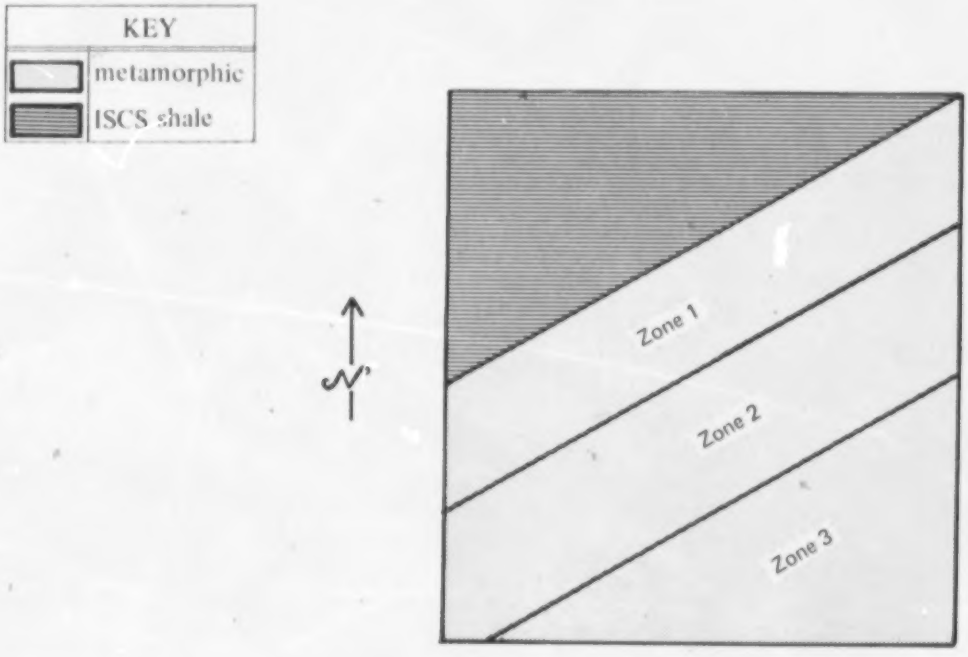
From the CP Rock Check Kit take samples K and J. Also get a hand lens and some dilute HCl.

1. Determine whether each is a sandstone, a shale, or a limestone.
2. Explain how you know.

CP 02-Res 9-1C

Get rock samples E, F, and N from the CP Rock Check Kit. The map below shows where ISCS shale and metamorphic rocks are found. Assume that the intensity of metamorphism is greatest in the southeast part of the map.

CP 02-Res 10-1C



1. In which zones would you most likely find each of the three rock samples you have been given?
2. Explain your answer.

CP 02-Res 11-1C

Suppose you have two different minerals to compare. How could you determine (define) their relative hardness?

CP 02-Res 11-2C

Get minerals i, m, and n from the CP Mineral Check Kit. Write the letter of each mineral, and after it state the kind of luster – metallic or nonmetallic – that it has.

CP 02-Res 11-3C

Get mineral samples m, g, and h from the CP Mineral Check Kit. Examine them carefully.

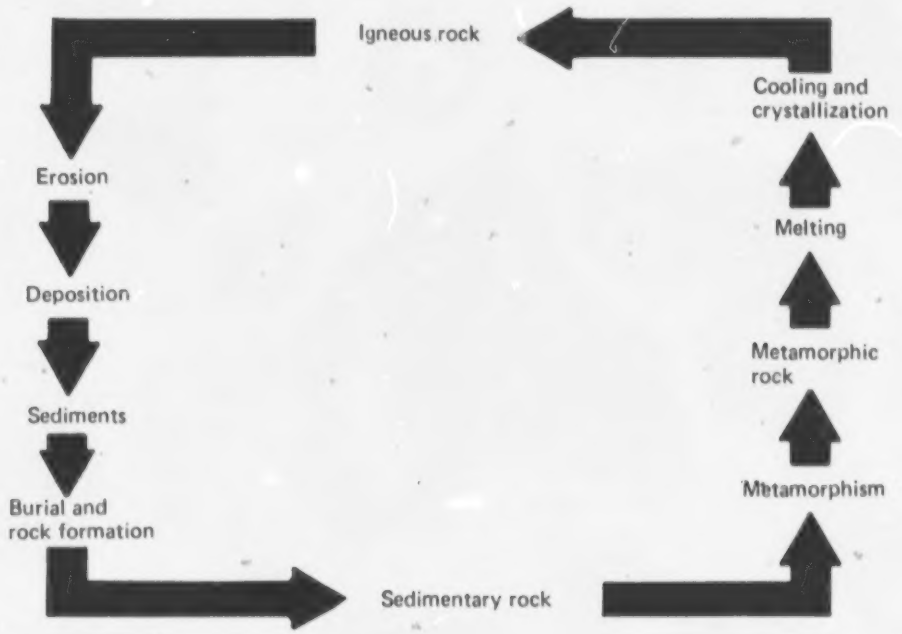
1. Write the letter of each mineral sample that shows cleavage.
2. Explain how you know.

CP 02-Res 11-4C

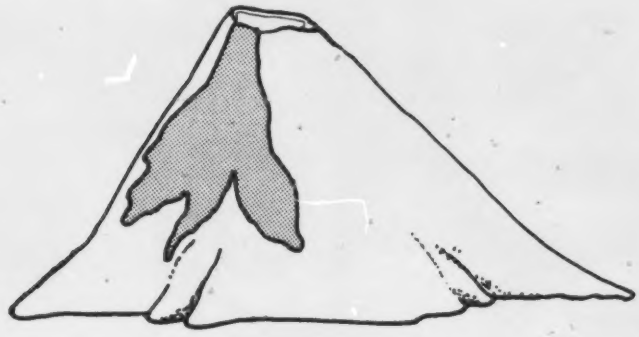
Get minerals j, i, and e from the CP Mineral Check Kit and a glass plate and a knife. Open your textbook to the "Mineral Classification Chart" on pages 68 and 69. Identify each mineral by writing its letter and name on your answer sheet.

CP 02-Res 12-1C

The diagram below shows a rock cycle. In this case, the sedimentary rock undergoes metamorphism and becomes metamorphic rock. Using arrows and labels from the diagram, draw on your answer sheet another path for a sedimentary rock in the cycle.



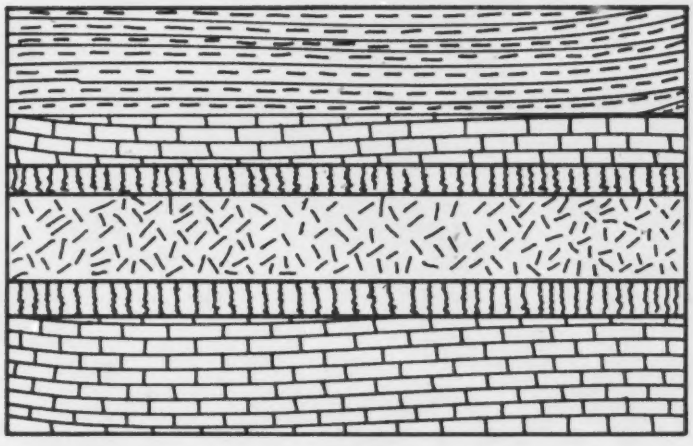
1. How was the mountain shown in the diagram below formed? **CP**
2. What evidence supports your answer? **02-Res 13-1C**



Look at the diagram below carefully. **CP**

1. Is the igneous rock an intrusion (intruded rock) or a flow? **02-Res 14-1C**
2. How do you know?

KEY	
Symbol	Rock Type
	sedimentary type 1
	sedimentary type 2
	igneous
	metamorphic



CP
02-Res 15-1C

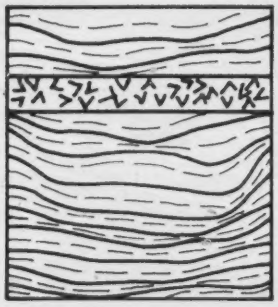
Both of the igneous rocks shown in the diagrams below are intrusions.

1. Which is a sill?
2. Which is a dike?
3. Explain your answers.

KEY	
Symbol	Rock
	igneous
	shale

Diagram A.

Diagram B.



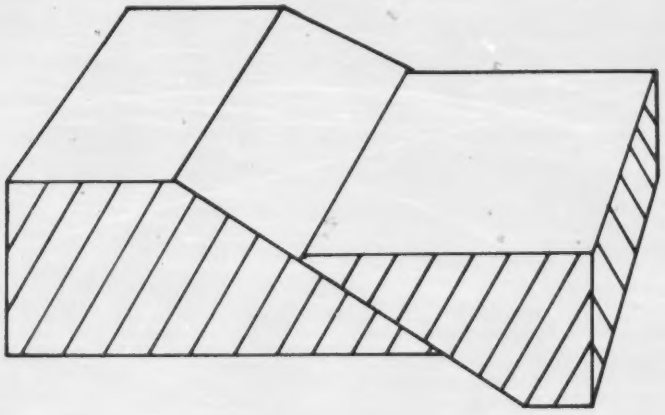
CP
02-Res 16-1C

Volcanoes are not the only source of lava flow. Much of the lava found in the northwestern United States flows onto the earth's surface through long cracks. What is the name given to such cracks in the earth's surface?

CP
02-Res 17-1C

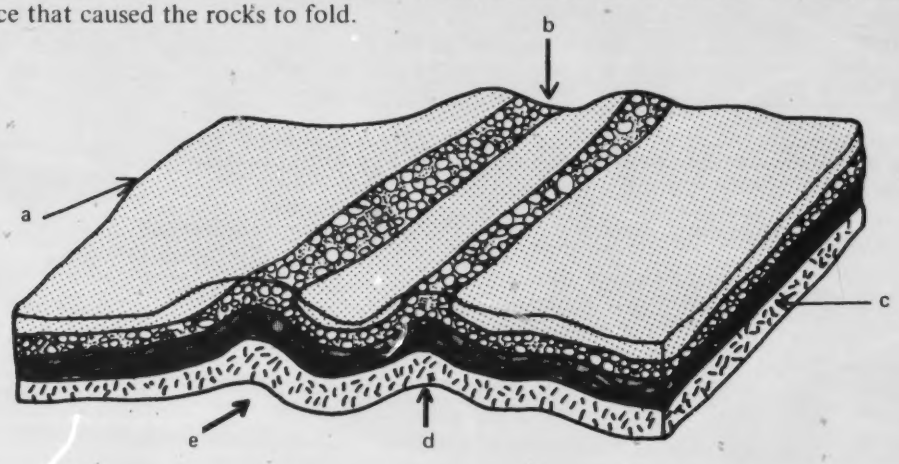
Copy the block diagram below onto your answer sheet.

1. Label the fault line.
2. Using arrows, show the possible directions the rocks could have moved along the fault.



The block diagram below illustrates rock strata that have been compressed into folds. Select the letter of the arrow which indicates the direction of the applied force that caused the rocks to fold.

CP
02-Res 18-1C



The data below concern two different mountains from different mountain chains.

1. Which one do you think is older?
2. Explain your answer.

CP
02-Res 19-1C

CHARACTERISTICS	MOUNT TWIRL	MOUNT SPIRAL
Height of peaks	12,000 feet	8,000 feet
Steepness of mountain sides	very steep	gentle slopes
Nature of valley	narrow	broad

Glacial ice can form from snow. Describe the process by which this happens.

CP
02-Res 20-1C

Dave suggested that each of the following climate conditions would always result in changing the size of a glacier.

CP
02-Res 21-1C

a. Snowfall in the winter which is exceeded by the loss from melting and evaporation in the summer
b. Snowfall in the winter which is equalled by the loss from melting and evaporation in the summer
c. Eighty inches of snowfall per year
d. Eighty-five inches of snowfall per year
e. Snowfall in the winter which exceeds the loss from melting and evaporation in the summer

Ruth disagreed, saying that only some of those conditions would result in a change in a glacier's size. Which options would cause a glacier's size to change?

Study the list of locations below very carefully.

CP
03-Core-1C

a. The eastern coastal plains
b. The Kentucky mountains
c. The Texas Gulf Coast
d. The Great Salt Lake in Utah

1. Which of them could be source areas of river systems? Choose all the correct answers.
2. What are the reasons for your choices?

Get a blank map of Australia from your teacher. Study both the average precipitation map and the elevation map shown below. On the basis of these two maps, where do you think river systems originate in Australia? Indicate your selections by shading those large general areas for each location on your blank map.

CP
03-Core-2C

Average precipitation in Australia

Elevation map of Australia

KEY	
Symbol	Precipitation (in cm)
	0-25
	26-50
	51-100
	101-150
	151-200

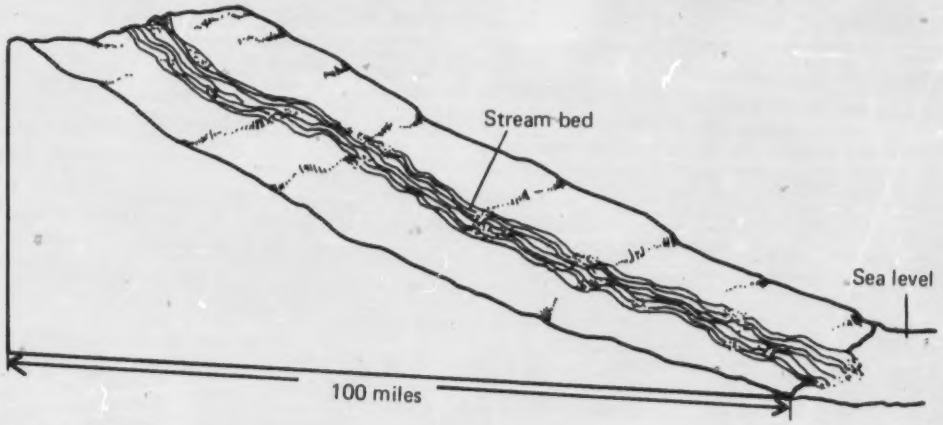
KEY	
Symbol	Elevation (in m)
	1526-2440
	611-1525
	306-610
	0-305

CP
03-Core-3C

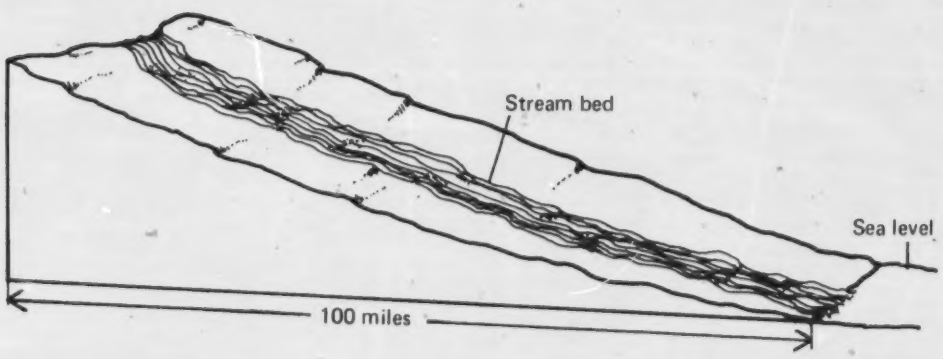
The diagrams below show the profiles of three different streams.

1. Select the profile of the stream with the greatest potential energy.
2. State your reason for the choice.

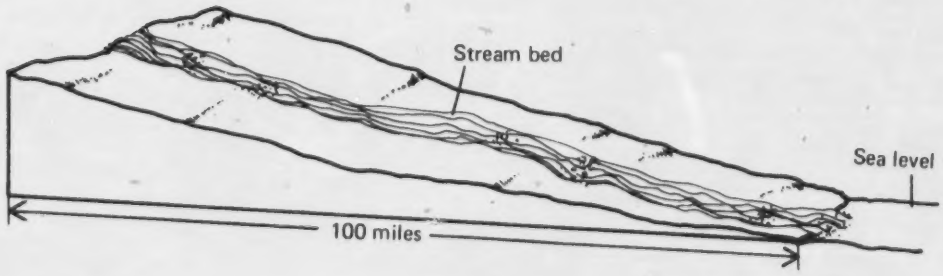
Profile a.



Profile b.



Profile c.



CP
03-Core-4C

Get a supply and two catch buckets and a 100-ml beaker from the supply area. Set a flow of 10 ml/sec in a stream table without changing its slope. When you have adjusted the equipment to this rate, ask your teacher to check it.

A stream table was used to determine how long it would take for 50 grams of a sand-gravel mixture to be eroded. The slope of the table was varied, but the amount of water used was the same for each trial. Study the data table below carefully. State how you think the slope of the stream table and the rate of erosion of the stream trough are related.

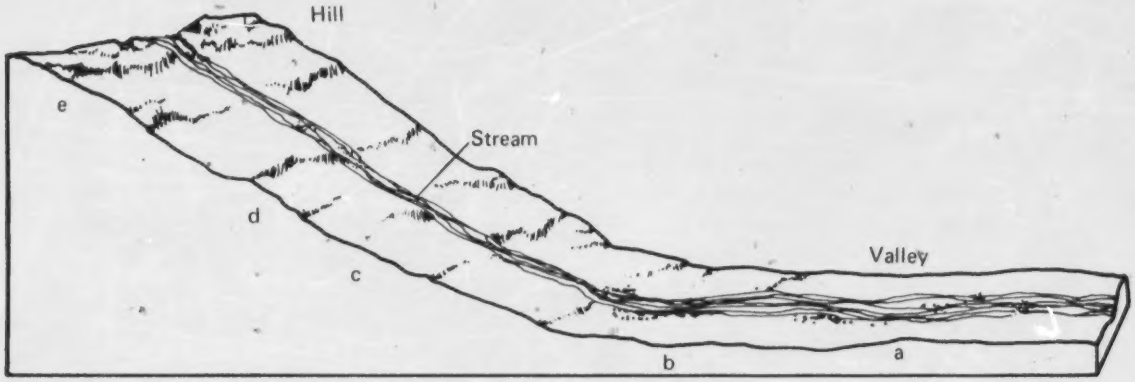
CP
03-Core-5C

HEIGHT OF STREAM TABLE'S UPPER END ABOVE ITS LOWER END (in cm)	TIME TO REMOVE 50 g OF A SAND-GRAVEL MIXTURE (in sec)	
	Trial 1	Trial 2
5	21	20
9	12	12
13	8	7

Study the stream profile shown below.

1. Select the letter showing where a gravel deposit might form.
2. Explain why it would form there.

CP
03-Core-6C



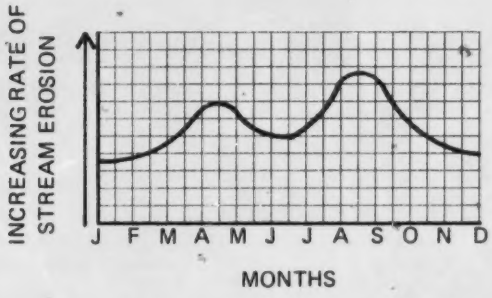
Examine the following list of statements. Each describes a change or an event that could occur in some region of the United States. Write the letter of any of the changes listed below that would almost immediately increase a river's kinetic energy.

CP
03-Core-7C

a. Thundershowers
b. Springtime warm-up in the mountains
c. Removal of large rocks from the river bed
d. Warm breezes blowing over the desert

CP
03-Core-8C

The graph below shows the erosion rate at a certain location on the St. James River for one year. What could be the major cause for the rate of erosion to vary as shown in the graph?



CP
03-Core-9C

If you could vary the conditions of a stream as you can a stream table in the laboratory, it would change the effect of the water flow. Get a copy of the following table (CP-03-Core-9C) from your teacher. Complete each box of the table by writing + to show that the change increases the effect, − to show that it decreases the effect, and 0 to show that it has no effect.

CHANGE OR DIFFERENCE	POTENTIAL ENERGY	KINETIC ENERGY	EROSION RATE
Smoother bed			
Less water			
Lower the starting height			
Harder bed			
Steeper slope			

CP
03-Core-10C

Which of the following features are formed when a river's kinetic energy has been reduced? Choose all the correct answers.

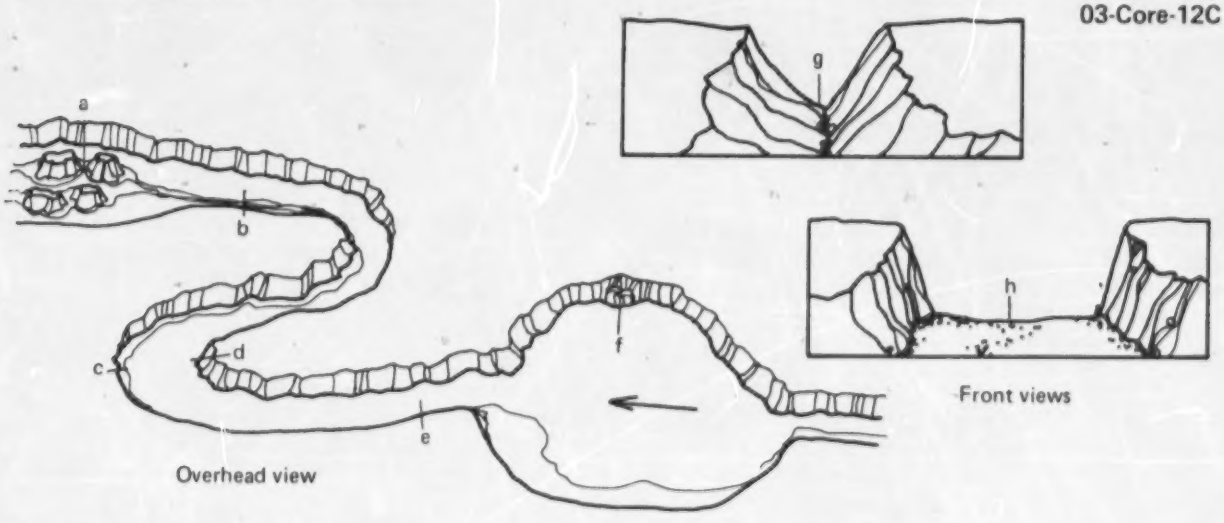
a. Stream channels
b. Spits
c. Sandbars
d. Undercut banks
e. Potholes

Different areas have different causes of erosion, depending on climate and geography. Erosion is often caused by flowing water, wave action, glaciers, and wind. What is the chief cause of erosion at each of the four areas numbered below on the map of the United States?

CP
03-Core-11C

Look at the diagrams below of a river.

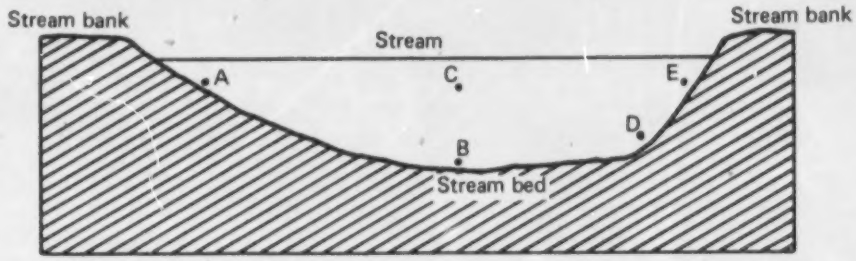
CP
03-Core-12C



For each of the pairs of letters, select the location where the river will flow faster. Assume that all parts of the river have the same slope.

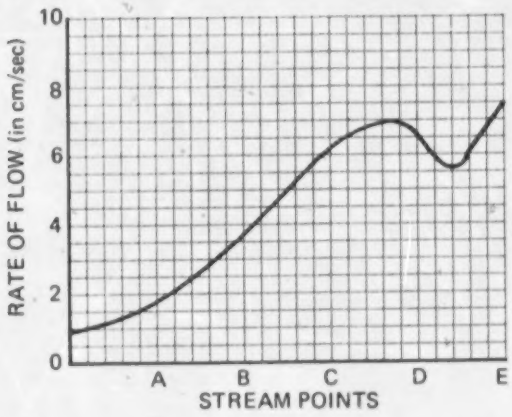
1. Location a or b
2. Location c or d
3. Location e or f
4. Location g or h

CP
03-Res 27-1C

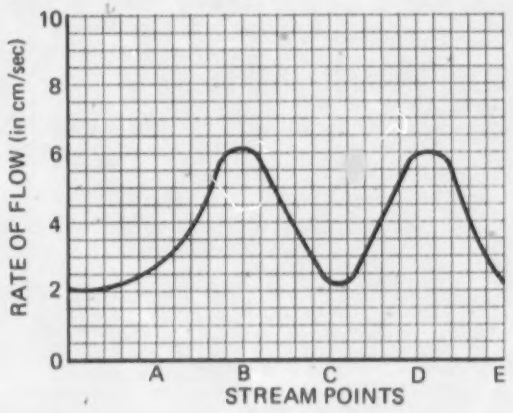


Water flows at several different rates at the different lettered points in the cross section of the stream shown above. Which of the graphs below best shows these different rates?

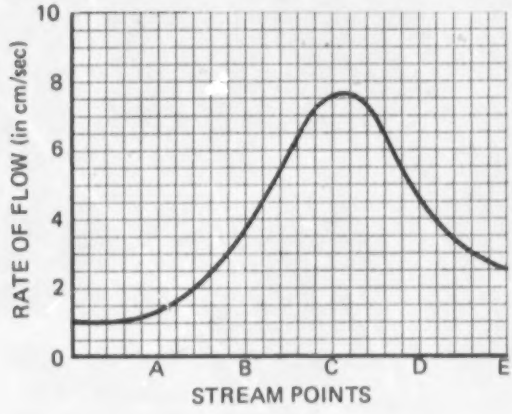
Graph a.



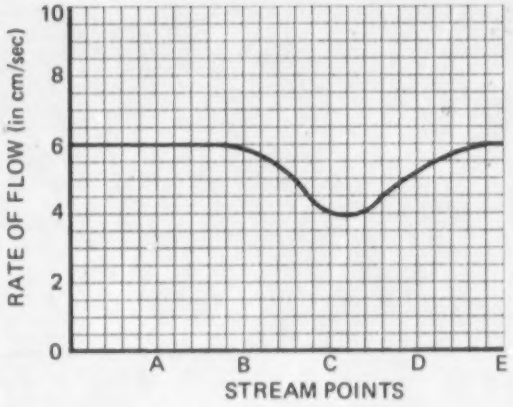
Graph b.



Graph c.



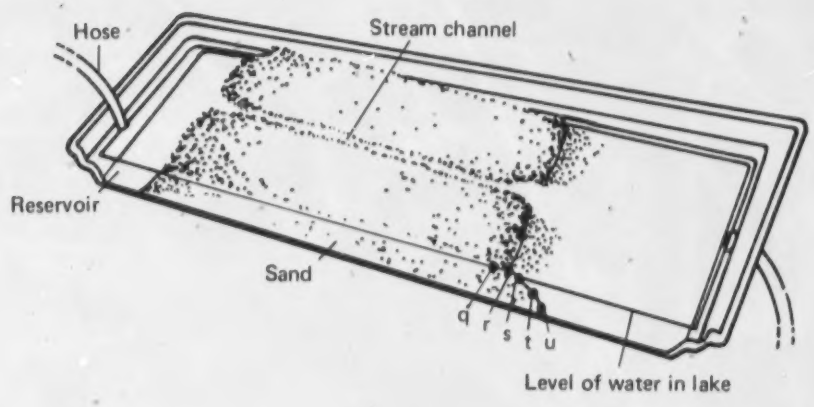
Graph d.



CP
03-Res 29-1C

The diagram below shows a stream table setup. Water will be allowed to flow at 5 ml/sec from the reservoir into the stream channel. The level of water in the lake will be kept constant.

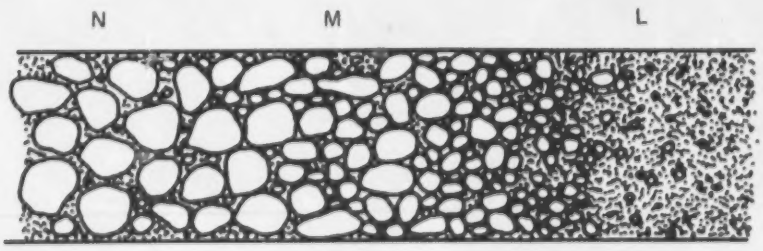
1. Select the maximum depth (q, r, s, t, or u) to which the channel will be cut.
2. Select the letter of the statement below which explains why you chose that depth.
   a. Channel depth is controlled by the level of the lake.
   b. Channel depth is controlled by the bottom of the stream table.
   c. Channel depth is controlled by the rate of flow.
   d. Channel depth is controlled by time.



CP
03-Res 32-1C

Below is a diagram of a lengthwise section of the river in a delta.

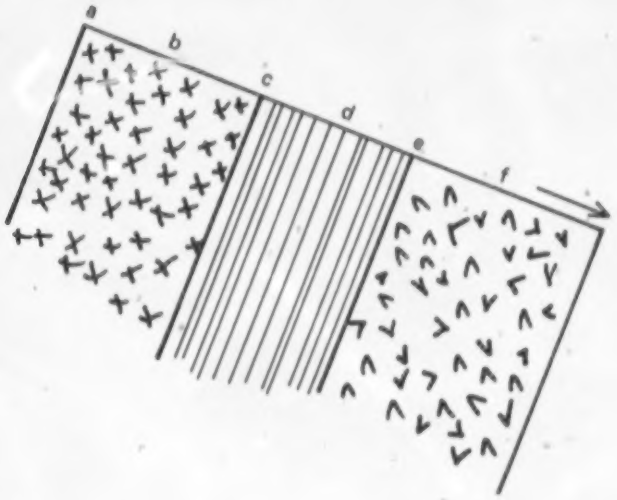
1. Did the river flow from L to M to N during the time of deposition?
2. Explain your answer.



CP
03-Res 33-1C

Study the diagram of the stream bed and its key below. The arrow shows the direction the water flows.

1. Write the letter of any place where a waterfall could form.
2. State the reason for your choice.

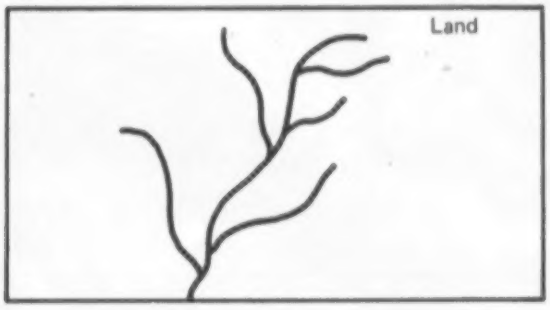


KEY	
Symbol	Rock
	granite
	slate
	basalt

CP
03-Res 34-1C

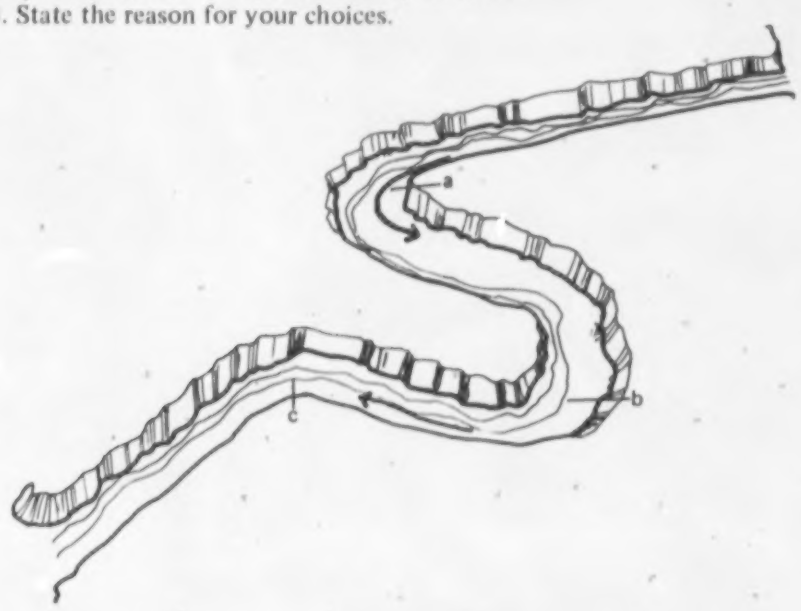
The map below shows the paths of several gullies. Copy this map onto your answer sheet or use the one provided by your teacher.

1. Use an arrow labeled *flow* to show the direction water will flow in one of the gullies.
2. Use an arrow labeled *growth* to show the direction in which one of the gullies will tend to grow.



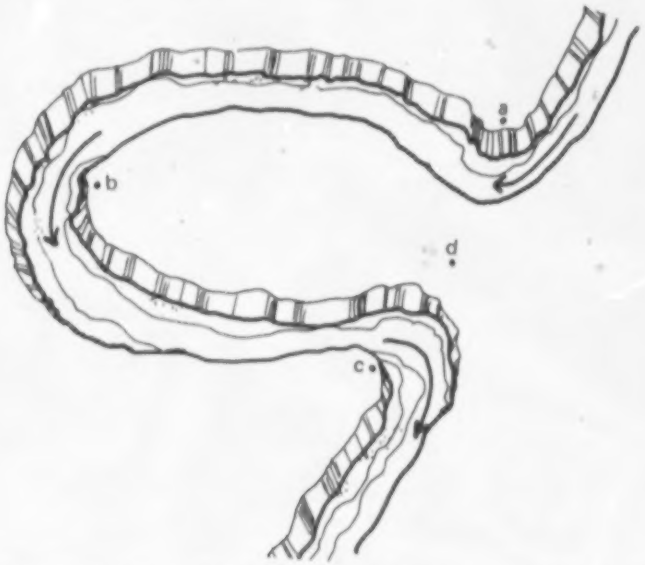
The diagram below shows the path of a river and three lettered points along its course. Arrows mark the direction the water flows. **CP 03-Res 36-1C**

1. At which points is erosion likely to occur?
2. At which points is deposition likely to occur?
3. State the reason for your choices.



Unless the river dries up, its stream bed will probably be changed by erosion. **CP 03-Res 36-2C**

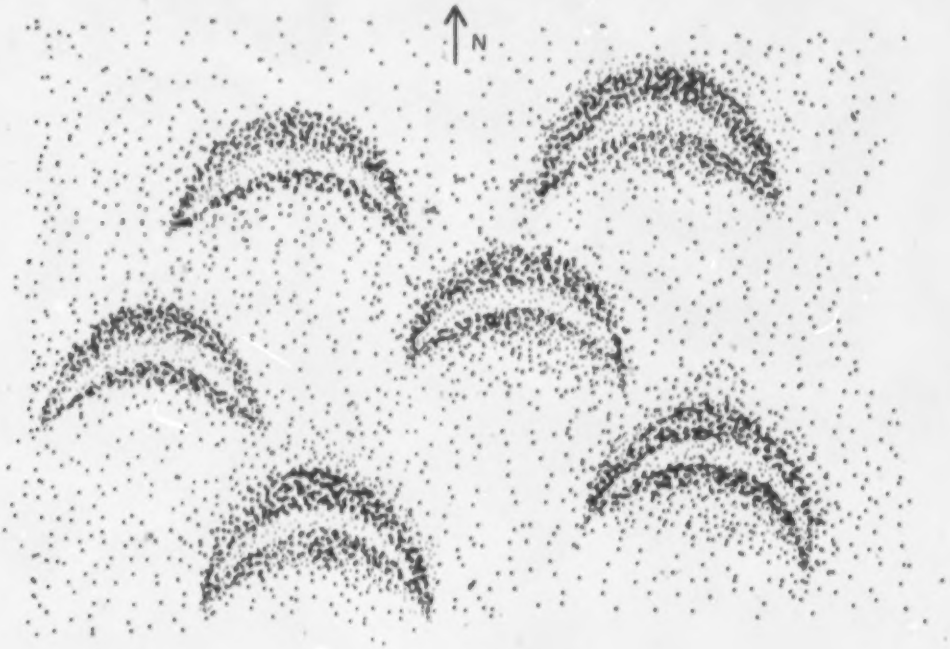
1. Which of the four areas indicated by letters is likely to be eroded first?
2. Explain the reason for your answer.



CP
03-Res 37-1C

The features on the map below are sand dunes.

1. What is the direction of the prevailing winds in this area?
2. How can you tell from the map?



Look carefully at the two diagrams below. **CP 04-Core-1C**

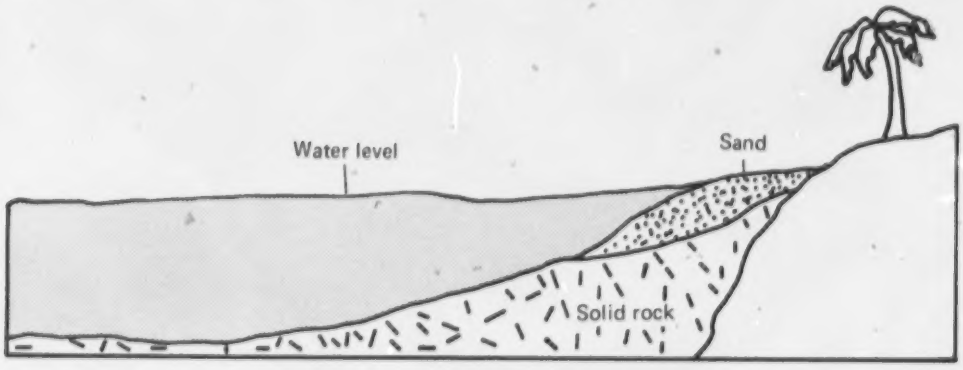
1. Select the letter of the diagram showing a beach which has been attacked by high-energy waves.
2. State the evidence that supports your answer.

Diagram a.

Diagram b.

The diagram below shows a shoreline with a sand beach and the water level at low tide. Suppose a hurricane hit the shoreline with high waves and winds for ten hours. **CP 04-Core-2C**

1. Explain how the beach would be affected.
2. Include in your explanation a diagram of the beach area after the hurricane passed through.



Study the three changes along a shoreline listed below. For each change, state whether it is evidence of high-energy wave action or low-energy wave action. **CP 04-Core-3C**

1. Accumulation of sand offshore, a bench
2. Gravel and solid rock covered by sand
3. Gravel and solid rock exposed where sand was once located

CP
04-Core-4A

Diagram A below shows a stream table used for showing the production of waves in the formation of a sand beach. Diagram B shows the same setup after the waves ceased.

1. How were these waves produced in the stream table?
2. What is an important variable in the formation of the beach?

Diagram A.

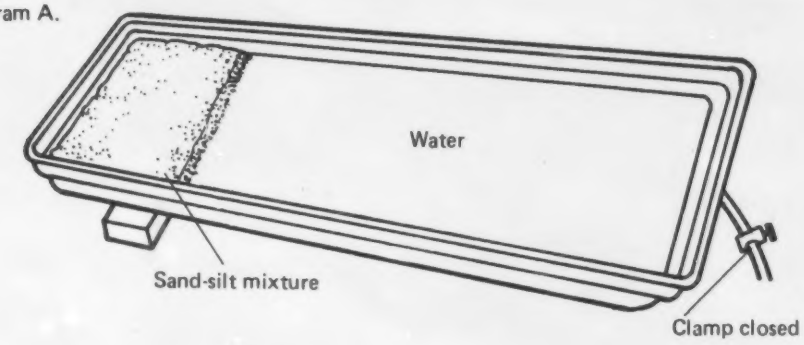
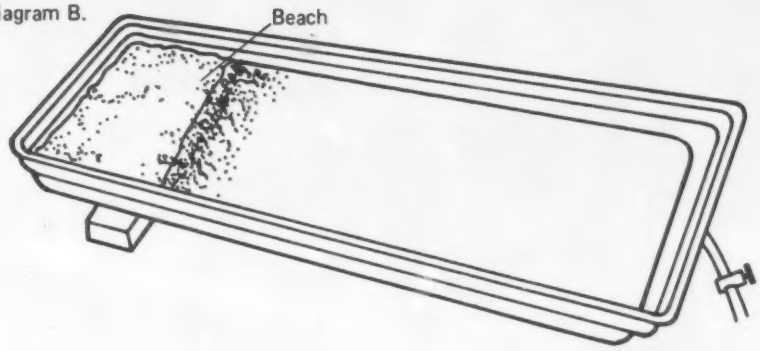


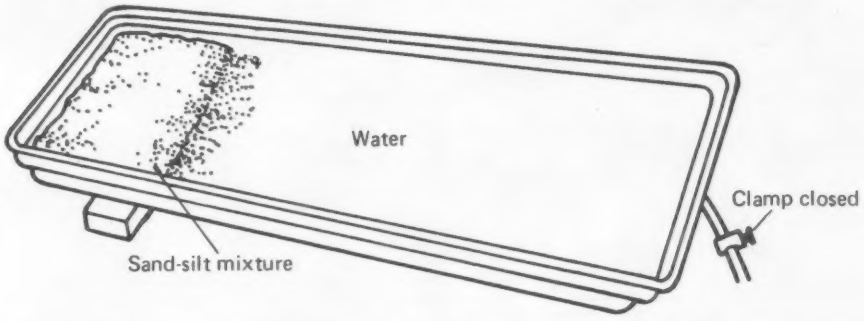
Diagram B.



CP
04-Core-5A

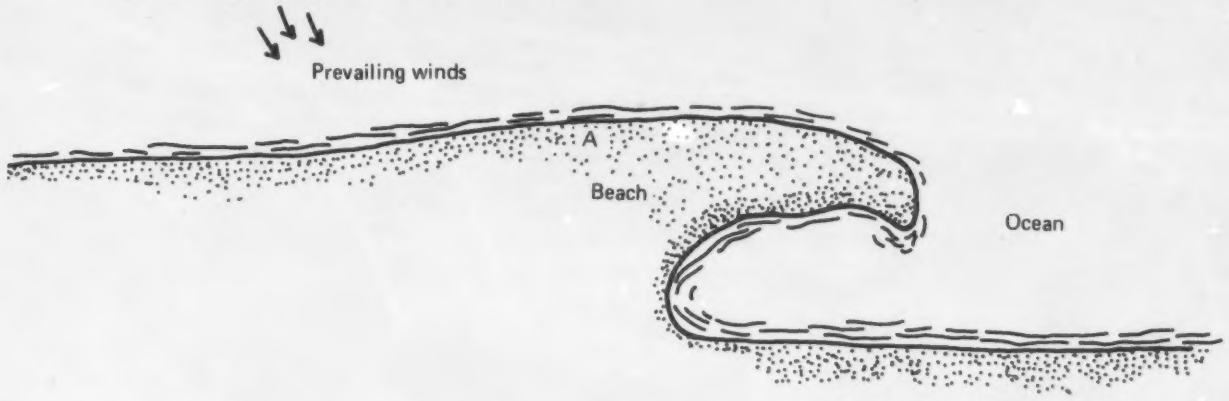
Set up a stream table as shown below. Secure any additional equipment you may need.

1. Produce waves that will result in the production of a sand bench. Show your teacher how you do this.
2. What important variable is needed to produce the sand bench?



Copy the diagram below, or get a copy of it from your teacher. Suppose waves erode sand at point A. **CP 04-Core-6C**

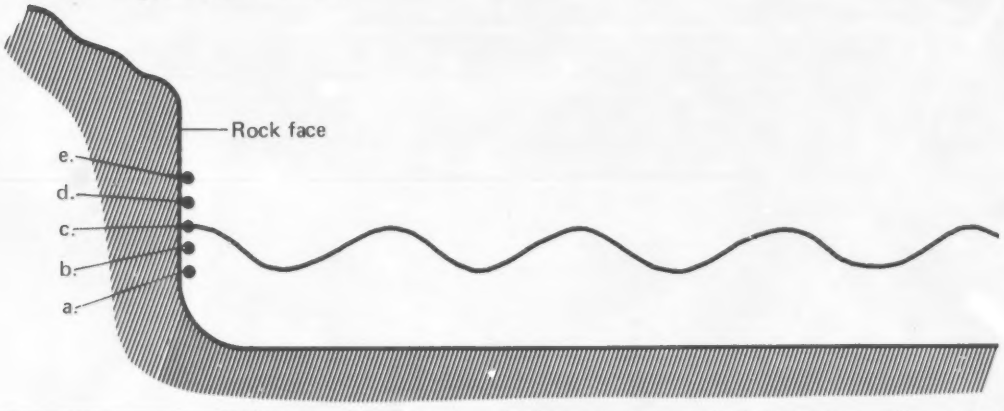
1. Shade in the place most of the sand is likely to be deposited.
2. Show the path of the sand with arrows.



Tracy Arm, which looks like a lake between two mountains, is a fiord in Alaska. San Francisco Bay on the West Coast of the United States is an estuary. What is the difference between a fiord and an estuary? **CP 04-Core-7C**

The diagram below shows waves hitting a rocky coastline. **CP 04-Res 38-1C**

1. Where will erosion of the rock face by these waves be greatest?
2. Explain your answer.



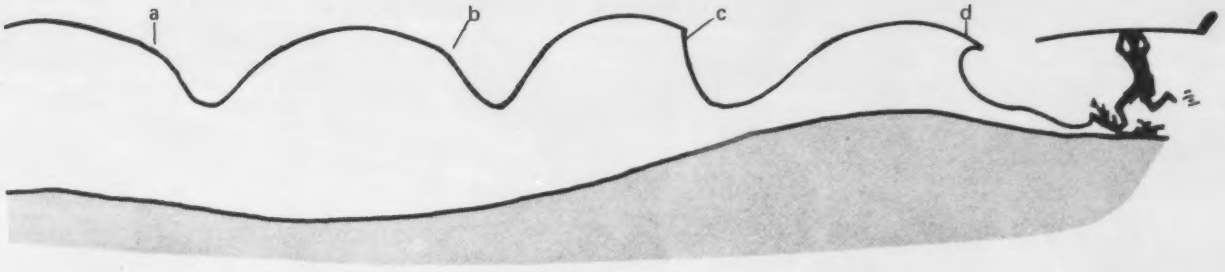
The following are features that are formed along shorelines. Select any features which are commonly associated with rocky or steeply inclined shorelines. **CP 04-Res 38-2C**

a. Spits
b. Benches
c. Caves
d. Pinnacles
e. Deltas

CP
04-Res 39-1C

Selecting the right wave at the right position is important to surfers.

1. Which lettered wave shown in the diagram below would give a surfer the best ride?
2. Explain why your choice is best and why you did not select the other waves.



CP
04-Res 40-1C

Study the three diagrams below of ocean waves approaching different shorelines.

1. Write the letter of any diagram which shows conditions for the bending of waves by refraction.
2. Write the letter of any diagram which shows conditions for the bending of waves by diffraction.
3. Explain your answers to parts 1 and 2.

Diagram a.

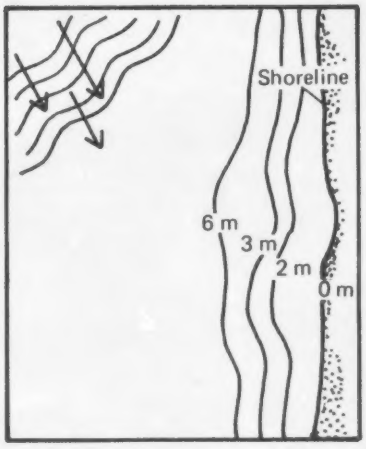


Diagram b.

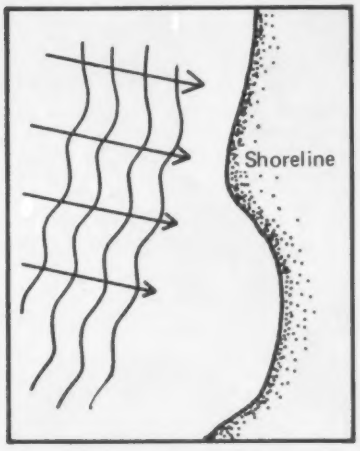
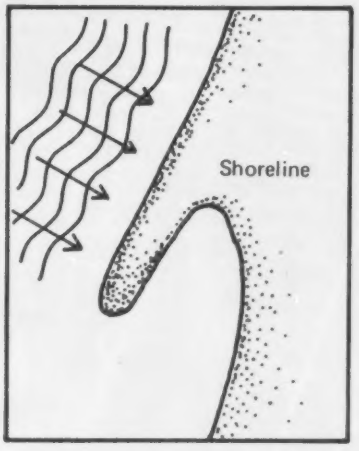


Diagram c.



Copy the diagrams below, or get copies of them from your teacher. Diagram 1 shows wave fronts approaching a bay. Diagram 2 shows wave fronts approaching a headland. Draw in more wave fronts on each diagram to show changes in the shape of the fronts that would occur as they move to the shore.

CP
04-Res 40-2C

Diagram 1.

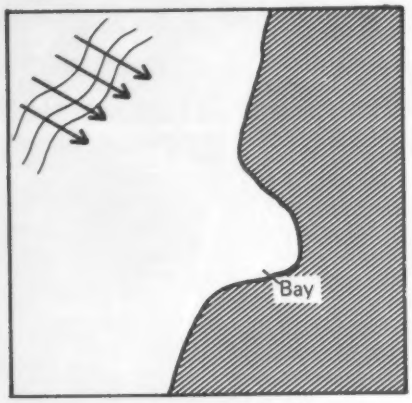
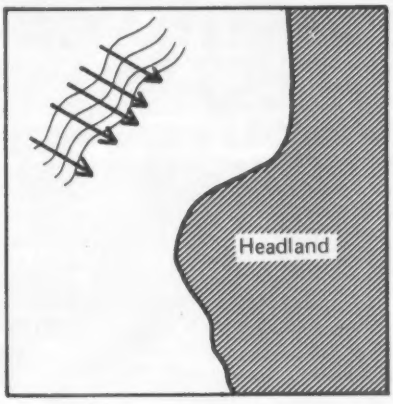


Diagram 2.



Copy the diagrams below, or get copies of them from your teacher. Diagram 1 shows wave fronts approaching an opening between two barriers. Diagram 2 shows wave fronts approaching a single barrier. Draw more wave fronts toward the land to show any probable changes in their direction as they move shoreward past the barriers.

CP
04-Res 40-3C

Diagram 1.

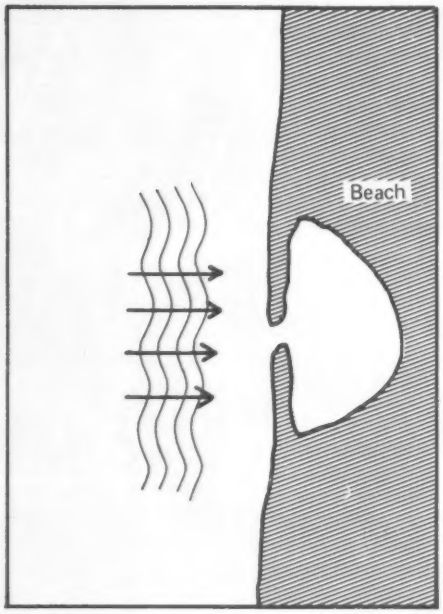
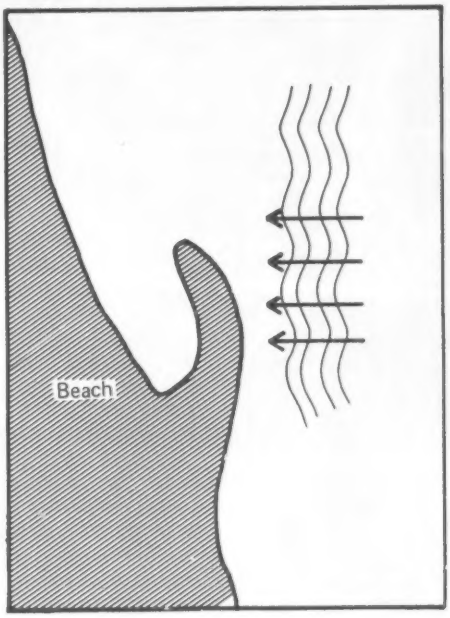


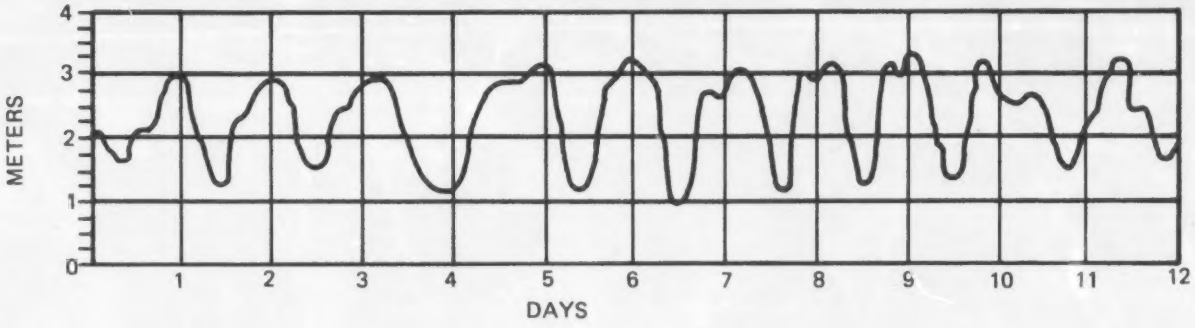
Diagram 2.



CP
04-Res 42-1C

The graph below shows the tidal record at Kwajaleiu Atoll for 12 days.

1. Estimate the mean sea level from this graph. (Estimate it; do not calculate it.)
2. Which group of readings did you consider to estimate the mean sea level?



CP
04-Res 43-1C

Which of the three diagrams below shows the relationship among the earth, the moon, and the sun which would produce the highest tides in the ocean?

Diagram a.

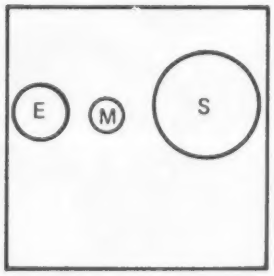


Diagram b.

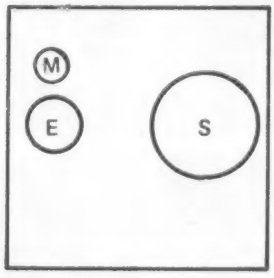
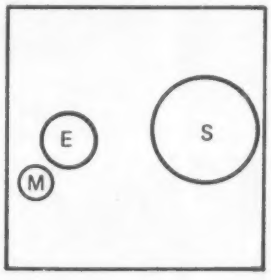
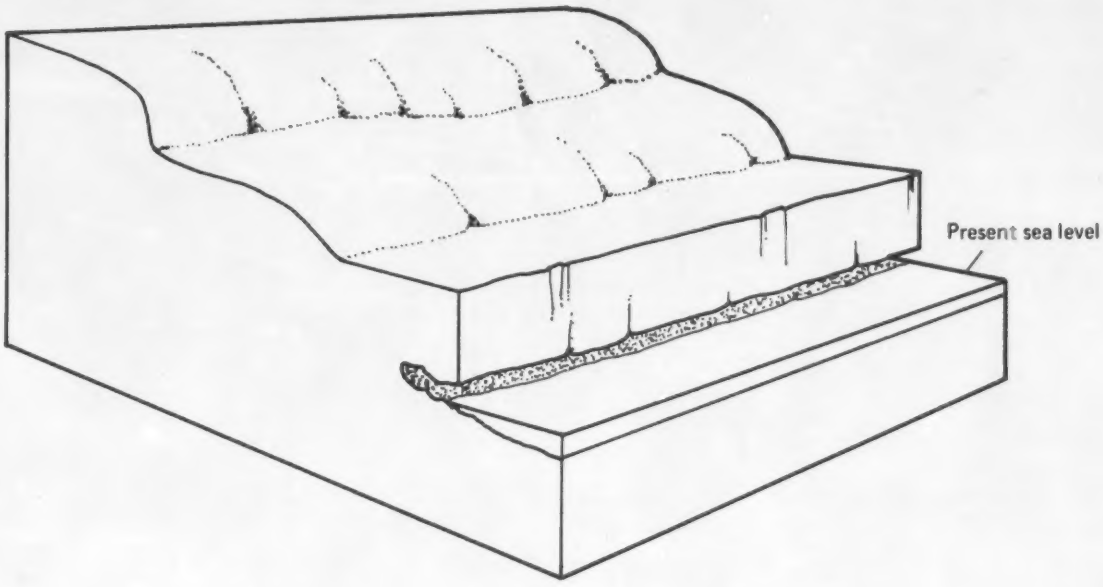


Diagram c.



Look carefully at the coastline and the benches (steps) shown in the diagram below. **CP**
04-Res 44-1C

1. What formed these benches?
2. State why there are several benches.



Study the diagram of the coastline below. In time, the ocean current will erode the area at X. **CP**
04-Res 46-1C

1. Select the arrow which shows the path along which the resulting sand will be carried.
2. What will the deposited sand form?